DOCUMENT RESUME

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TITLE	Ecology and Oil Spills, 17-1. Military Curriculum Materials for Vocational and Technical Education.
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IDENTIFIERS	Military Curriculum Project; Oil; *Oil Pollution; *Oil Spills

ABSTRACT

This single-lesson course in ecology and oil spills for the secondary/postsecondary level comprises one of a number of military-developed curriculum packages selected for adaptation to vocational instruction and curriculum development in a civilian setting. The purpose stated for the 2-hour course is to provide students with an understanding of the effects of oil spills on the environment. The individualized, self-paced course may be used as a sub-unit in petroleum, ecology, marine sciences, or public service courses. Introductory materials include administrative instructions and a lesson assignment detailing the scope and objectives. Three sections contain informative materials on (1) oil spills and their effect on ecology (oil spill classification, estimated volume of spills, cause of spills, ecological effects, and preventive measures), (2) federal organization for oil pollution control (the national response center, the national response team, regional response centers, on-scene commanders, contingency plans, and response phases), and (3) cleanup and disposal (cleanup methods, recovery and disposal of waste oil, and after-action reports). Appendixes contain references, information on the federal water quality administration regional offices, a model oil spill contingency plan, and an extract from the Golden Gate Oil Spill report of January 1971. (YLB)

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MILITARY CURRICULUM MATERIALS

The military-developed curriculum materials in this course package were selected by the National Center for Research in Vocational Education Military Curriculum Project for dissemination to the six regional Curriculum Coordination Centers and other instructional materials agencies. The purpose of disseminating these courses was to make curriculum materials developed by the military more accessible to vocational educators in the civilian setting.

The course materials were acquired, evaluated by project staff and practitioners in the field, and prepared for dissemination. Materials which were specific to the military were deleted, copyrighted materials were either omitted or approval for their use was obtained. These course packages contain curriculum resource materials which can be adapted to support vocational instruction and curriculum development.

The National Center Mission Statement

The National Center for Research in Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning, preparation, and progression. The National Center fulfills its mission by:

- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

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Military Curriculum Materials
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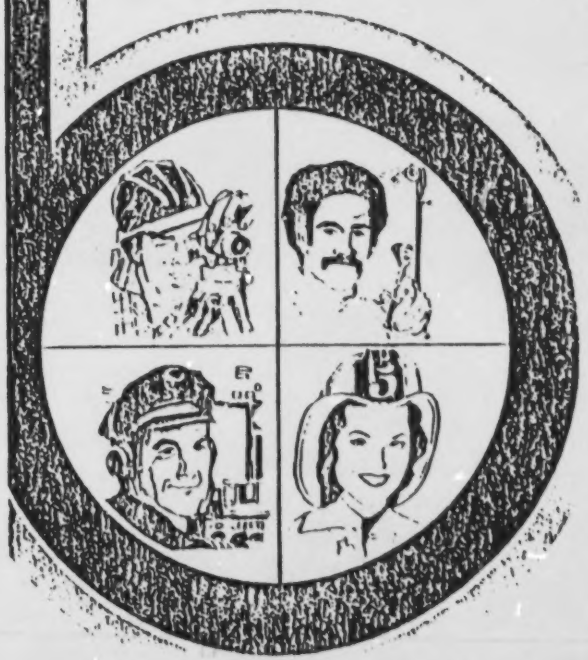

Military Curriculum Materials Dissemination Is . . .

an activity to increase the accessibility of military developed curriculum materials to vocational and technical educators.

This project, funded by the U.S. Office of Education, includes the identification and acquisition of curriculum materials in print form from the Coast Guard, Air Force, Army, Marine Corps and Navy.

Access to military curriculum materials is provided through a "Joint Memorandum of Understanding" between the U.S. Office of Education and the Department of Defense.

The acquired materials are reviewed by staff and subject matter specialists, and courses deemed applicable to vocational and technical education are selected for dissemination.

The National Center for Research in Vocational Education is the U.S. Office of Education's designated representative to acquire the materials and conduct the project activities.

Project Staff:

Wesley E. Budke, Ph.D., Director
National Center Clearinghouse

Shirley A. Chase, Ph.D.
Project Director

What Materials Are Available?

One hundred twenty courses on microfiche (thirteen in paper form) and descriptions of each have been provided to the vocational Curriculum Coordination Centers and other instructional materials agencies for dissemination.

Course materials include programmed instruction, curriculum outlines, instructor guides, student workbooks and technical manuals.

The 120 courses represent the following sixteen vocational subject areas:

- Agriculture
- Aviation
- Building & Construction Trades
- Clerical Occupations
- Communications
- Drafting
- Electronics
- Engine Mechanics
- Food Service
- Health
- Heating & Air Conditioning
- Machine Shop
- Management & Supervision
- Meteorology & Navigation
- Photography
- Public Service

The number of courses and the subject areas represented will expand as additional materials with application to vocational and technical education are identified and selected for dissemination.

How Can These Materials Be Obtained?

Contact the Curriculum Coordination Center in your region for information on obtaining materials (e.g., availability and cost). They will respond to your request directly or refer you to an instructional materials agency closer to you.

CURRICULUM COORDINATION CENTERS

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Ecology And Oil Spills

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ECOLOGY AND OIL SPILLS

Correspondence Course 17-1

1

Developed by:

United States Army

Development and Review Dates

August 1975

Occupational Area:

Public Services

Cost:

Print Pages:

81

Availability:

Military Curriculum Project, The Center for Vocational Education, 1960 Kenny Rd., Columbus, OH 43210

Suggested Background:

None

Target Audiences:

Grades 10-adult

Organization of Materials:

Single lesson text with objectives, readings, exercises, and appendices

Type of Instruction:

Individualized, self-paced

Type of Materials:	No. of Pages:	Average Completion Time:
Ecology and Oil Spills	74	Flexible

Supplementary Materials Required:

None

Course Description:

This single lesson course will provide the student with an understanding of the effects of oil spills on the environment. It includes information on the Federal five-place system for oil spill control operations, the relationship of class III supply point operations and oil spills, and cleanup and disposal operations.

The lesson is divided into three sections with accompanying appendices

Section I – *Oil Spills and Their Effect on Ecology* provides an introduction to the section; classifies oil spills; and discusses the estimated volume of spills, cause of spills, ecological effects, and preventive measures.

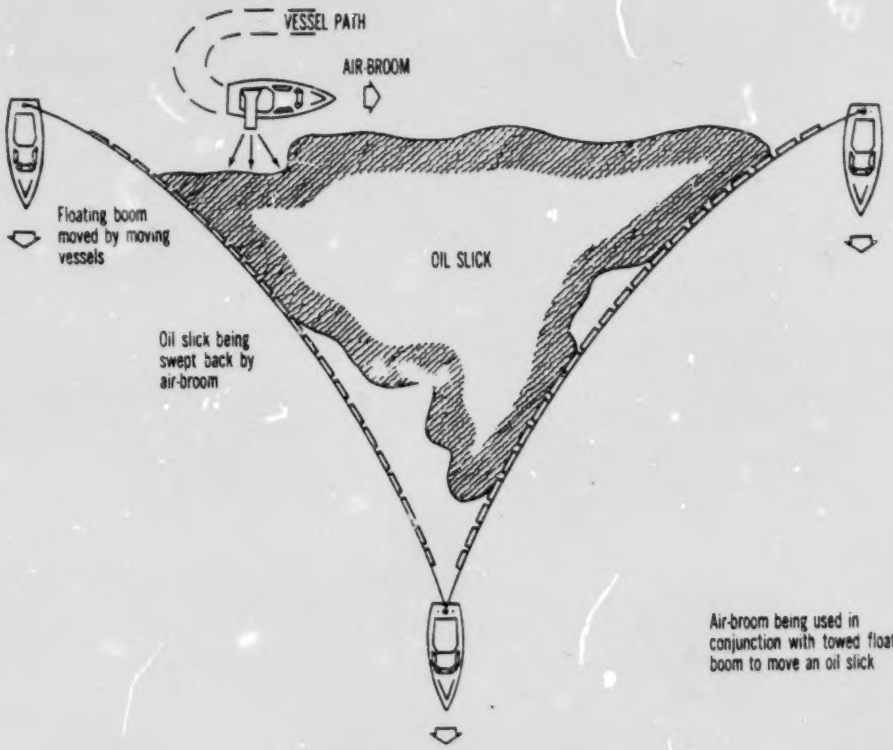
Section II – *Federal Organization for Oil Pollution Control* discusses the national response center, the national response team, regional response centers, on-scene commanders, contingency plans, and response phases.

Section III – *Cleanup and Disposal* covers cleanup methods, recovery and disposal of waste oil, and after-action reports.

The Appendices contain references, information on the federal water quality administration regional offices, a model oil spill contingency plan, and an extract from the Golden Gate Oil Spill report of January 1971.

This single lesson course can be used as a sub-unit in petroleum, ecology, marine sciences; or public service courses.

U.S. ARMY QUARTERMASTER SCHOOL
CORRESPONDENCE SUBCOURSE



Air-broom being used in conjunction with towed floating boom to move an oil slick

QM0492

ECOLOGY AND OIL SPILLS

17-1

Prepared by
United States Army Quartermaster School
Fort Lee, Virginia 23801
Supply Training Center of the Army School System

DECEMBER 1973

[Reprint [B], August 1975]

Army-Fort Lee, Va.-10701-75-600-4

MOS RELATIONSHIPS

Officer concerned in the field of petroleum. Enl MOS relationship 76W20, MOS qualification and test preparation.

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QM0492

ECOLOGY AND OIL SPILLS

SECTION I

INTRODUCTION

1. SCOPE. This subcourse is designed to provide the student with an understanding of the effects of oil spills on the ecology. It includes information on the Federal five-place system for oil spill control operations, the relationship of class III supply point operations and oil spills, and cleanup and disposal operations.

2. APPLICABILITY. This subcourse is of general interest to all personnel involved with petroleum operations. It is of particular interest for individuals anticipating an assignment dealing with the handling and storage of petroleum. This subcourse will provide the student with a working knowledge of the effects of oil spills and the methods of dealing with them. This knowledge, reinforced by experience or on-the-job training, will enable the student to apply effective preventive or remedial measures to eliminate or reduce oil spills.

3. COMPOSITION. This subcourse consists of one lesson totaling 2 hours of correspondence course instruction.

4. PROGRAM OF CONTINUING STUDY. When you successfully complete this subcourse, we recommend that you apply to take one or more of the following:

a. QM0417, Petroleum Supply Catalog.

b. QM0544, Liquefied Petroleum Gases (LPG).

SECTION II

ADMINISTRATIVE INSTRUCTIONS

5. MATERIALS CHECK. Check to make sure you have any study materials listed on the cover. If anything is missing, unreadable, or not in order, let us know right away. Use a Student Inquiry Sheet; we've bound one into the back of this booklet. Take a look at your lesson answer form. Is the subcourse number on the form the same as the number of this subcourse? If not, get the word to us; we'll have a correct answer form on its way as fast as we can. Don't forget to include your social security account number (student number), mailing address, and ZIP code when you write.

6. LESSON ORGANIZATION. This subcourse is organized into a single booklet containing materials needed to complete the subcourse. The booklet has all the information and material you need to complete the lesson and consists of a lesson assignment, lesson text (sometimes reinforced by accompanying materials), lesson exercises, and a student inquiry sheet.

7. LESSON EXERCISES. Take the lesson exercises only after you have thoroughly studied the lesson text. Remember, your answers must be based on the study assignment, not on personal experience or information from other sources.

a. If you are a Quartermaster School student, use the machine-process answer form for your answers to the lesson exercises. We know you want to receive credit for this subcourse, so be sure to send the completed form to the School for grading. Please don't tear, bend, or puncture this form; if you do, the grading machine will toss it back at us, ungraded.

b. If you are a student of another school, use the instructions and answer form provided by that school.

8. EVALUATING SUBCOURSE. You will find a QMFL Form 990-1 (Student Evaluation of Subcourse) at the end of the lesson exercises. Before filling out this form, read the instructions at its top. After filling out the form, return it with your lesson answer form.

QM0492 Credit Hours: 2

LESSON ASSIGNMENT

SUBJECT	Ecology and Oil Spills.
REQUIRED STUDY ASSIGNMENT	Lesson Text.
RECOMMENDED STUDY ASSIGNMENT	Appendix C: A Model Oil Spills Contingency Plan. Annex 1--Equipment Guide. Annex 2--Equipment and Material Available. Other Annexes, Appendix D--After Action Report. (Student will not be tested on recommended study assignment. However, if the student is not familiar with the purpose and procedures of Oil Spills Contingency Plans, then he may find the study of appendixes A, C, D and the annexes helpful.)
SCOPE	Oil spills and their effect on the ecology; the Federal five-phase system for oil spill control operations; relationship of class III supply point operations and oil spills and cleanup and disposal operations.
OBJECTIVES	As a result of successful completion of this assignment, the student will be able to--

1. List and define three classes of oil spills.
2. Identify three major causes of oil spills.
3. Describe the effects of oil spills on the ecology.
4. Name the five phases of the Federal five-phase system for oil spill control operations.
5. Cite the preventive measures against oil spills required in class III supply point operations.
6. Describe the methods used to clean up oil spills.

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LESSON TEXT

SECTION I

OIL SPILLS AND THEIR EFFECT ON ECOLOGY

1. INTRODUCTION. As man has gained in numbers, affluence, and technology, he has found that his activities have increasingly polluted or contaminated his environment. After years of careless technology and waste, man has finally realized that the constant contamination of his environment is detrimental to his well being. One of the most damaging effects of man's careless and wasteful endeavors has been the spilling of oil in coastal and inland waterways. These spills have caused contamination of large beach areas, landscape, and marine life. Cleanup and restoration efforts are reasonably successful, but they are difficult and costly. Moreover, there is usually lasting damage to the ecology of oil-contaminated areas.

2. CLASSIFICATIONS OF OIL SPILLS. Oil spills are classified according to the volume of oil involved, the location of the spill, and the potential threat to public health or welfare, as follows:

a. MINOR SPILL. An oil spill of less than 1,000 gallons inland or less than 10,000 gallons in coastal waters is classified as a minor spill. The spill must not be a threat to public health or welfare.

b. MEDIUM SPILL. An oil spill of 1,000 to 10,000 gallons inland, or 10,000 to 100,000 gallons in coastal waters, or which poses a threat to public health or welfare, is classified as a medium spill.

c. MAJOR SPILL. A major oil spill is one which involves more than 10,000 gallons inland or more than 100,000 gallons in coastal waters. The spill must be a threat to public health or welfare, or it must generate wide public interest. Regardless of volume, a spill should be classified as a medium or major spill if it occurs in critical water areas or endangers these areas, if it generates critical public concern, if it becomes the focus of an enforcement action, or if it poses a threat to public health or welfare.

3. ESTIMATED VOLUME OF SPILL. The volume of an oil spill may be estimated by the appearance of the spill, as indicated in the table below:

Table 1. Appearance factors used to estimate the volume of an oil spill

Appearance	Standard Term	Volume Gal./Sq.Mile
Barely visible under most favorable light.	Barely visible	25
Visible as a silvery sheen on surface water.	Silvery	50

//

Table 1 (Continued)

Appearance	Standard Term	Volume Gal./Sq. Mile
First trace of color may be observed.	Slightly colored	100
Bright bands of color are visible.	Brightly colored	200
Colors begin to turn dark brown.	Dull	666
Much darker brown.	Dark	1,332

4. CAUSES OF OIL SPILLS. Natural oil seepage from underwater oil deposits have always been noted in rivers, lakes, and seas. In the early days of drilling, a combination of insufficient knowledge and faulty equipment made oil spills almost a normal part of operations. Over 10,000 oil spills occur each year. The destructive characteristics of oil out of control have never been better illustrated than when the "Torrey Canyon," with 119,000 tons of crude oil in her tanks ran aground and broke up off the southern coast of England in March 1967. A more recent large oil spill occurred off the coast of Santa Barbara, California, on January 28, 1969, when the eruption of crude oil from the ocean floor occurred during normal drilling operations by Platform A of the Union Oil Company. There have also been recent large oil spills off the coast of Louisiana. Figure 1 illustrates the major sources of oil pollution recorded in 1968. Considering the size of the worldwide petroleum industry, it is remarkable that oil pollution has been kept to a comparative minimum. In general, the major causes of oil spills are as follows:

a. NATURAL (ACT OF GOD). Natural oil spills from seepage of underground or underwater oil deposits.

b. HUMAN ERROR. Human errors such as the improper opening and closing of valves, the improper deballasting of tankers, and carelessness.

c. MECHANICAL FAILURE. Mechanical failures such as the rupture of pipelines, breaking up of tankers at sea, and failure of offshore drilling equipment.

5. EFFECTS ON THE ECOLOGY. Once an area has been contaminated by oil, the whole character of the environment is changed. Oil clings to solids--beaches, rocks, animal hair, or bird feathers--and is not easily removed. Cleaning up a contaminated area is time consuming, difficult, and costly. Aside from the cost of property damage, labor, and materials for cleanup, ecological costs of a more permanent nature must be considered, such as the permanent destruction of fish and wildlife and the destruction of natural beauty and landscape.

6. PREVENTIVE MEASURES. Wherever oil is used, stored, or moved in the petroleum handling system, there are countless opportunities for the oil to be spilled.

1. VESSELS		
a. TANKERS		84
b. DRY CARGO		112
c. BARGES		68
d. NAVY		50
e. PASSENGER		3
f. MISCELLANEOUS (MOSTLY TUGS & FISHING VESSELS)		29
g. UNIDENTIFIED VESSELS		2
SUBTOTAL, VESSELS	348	
2. ONSHORE SOURCES		
a. LOADING TERMINALS		58
b. OTHER ONSHORE SOURCES		227
SUBTOTAL, ONSHORE SOURCES	285	
3. OFFSHORE STRUCTURES		9
4. UNKNOWN SOURCES		72
TOTAL		714

Figure 1. Major sources of oil pollution recorded in 1968.

Every effort should be made to prevent such spills by applying preventive measures when supply point drainage is planned and when marine loading and unloading and storage operations are carried out, and by enforcing strict security measures.

a. CLASS III SUPPLY POINT OPERATIONS. Class III supply point sites are selected to provide for adequate water supply and good drainage. Drainage should not be allowed to flow into open streams or on cultivated land because of the contaminative nature of petroleum products. Streams will become polluted with petroleum drainage, causing death to marine life. Also, if the stream is used for fresh water supply, the polluted water will be unfit for use. Petroleum drainage on crop land will kill vegetation and render the land unfit for cultivation. During loading and unloading operations, fuel transfers, pumping operations, and tank cleaning operations, extreme care must be taken with hose connections and pumps to avoid spills.

b. PIPELINE OPERATIONS. Pipeline operations are prone to cause oil pollution because of line breaks. If a line break occurs, care must be taken to recover as much fuel as possible and to evacuate the pipeline before repairs are made. Use of proper materials, proper construction, fabrication, maintenance, inspection, and testing of the line will greatly minimize pollution caused by line breaks.

SECTION II

FEDERAL ORGANIZATION FOR OIL POLLUTION CONTROL

7. NATIONAL RESPONSE CENTER. The National Response Center (NRC) located at Headquarters, U.S. Coast Guard, Washington, D.C., is the headquarters for activities relative to oil spills. The NRC serves as an information storage center and provides personnel and facilities for the smooth and efficient functioning of these activities.

8. NATIONAL RESPONSE TEAM. The National Response Team (NRT) is composed of representatives from the primary Federal agencies (Department of Transportation; Department of Health, Education, and Welfare; Department of the Interior; and Department of Defense) and advisory agencies (Regional Response Center and On-Scene Commander) (fig. 2). The NRT is responsible for planning and preparedness actions before an oil spill occurs. When a spill occurs, the NRT performs as an emergency response team.

a. PLANNING AND PREPAREDNESS ACTIONS. The NRT is responsible for planning and preparedness actions as follows:

(1) Reviews regional spill response and equipment readiness reports to insure that regional and national planning and coordination for combating oil spills are adequate.

(2) Insures that Regional Response Teams (RRT's) coordinate regional plans with the agencies involved. The NRT advises the RRT's on matters which the RRT's cannot resolve.

(3) Develops coordination procedures for Federal, State, and local government and private agencies to follow in responding to oil spills.

(4) Establishes and maintains a standing committee for revising the national plan. The committee submits suggested revisions to the NRT for consideration. Committee members are provided by the primary agencies. When revisions or proposed amendments affect advisory agencies, these agencies participate in the functions of the standing committee.

(5) Based on the continued evaluation of response actions, considers and makes recommendations to the appropriate agencies for the training and equipping of response team personnel; necessary research, development, demonstration, and evaluation activities to support response actions; and equipment, material stockpiling, and other operational matters as the need arises.

(6) Establishes and maintains liaison with the U.S. National Committee for the Prevention of Pollution of the Seas by Oil. The NRT also maintains international coordination for contingency planning.

b. EMERGENCY RESPONSE. The NRT performs as an emergency response team when an oil spill occurs. The team is activated when the spill of oil exceeds

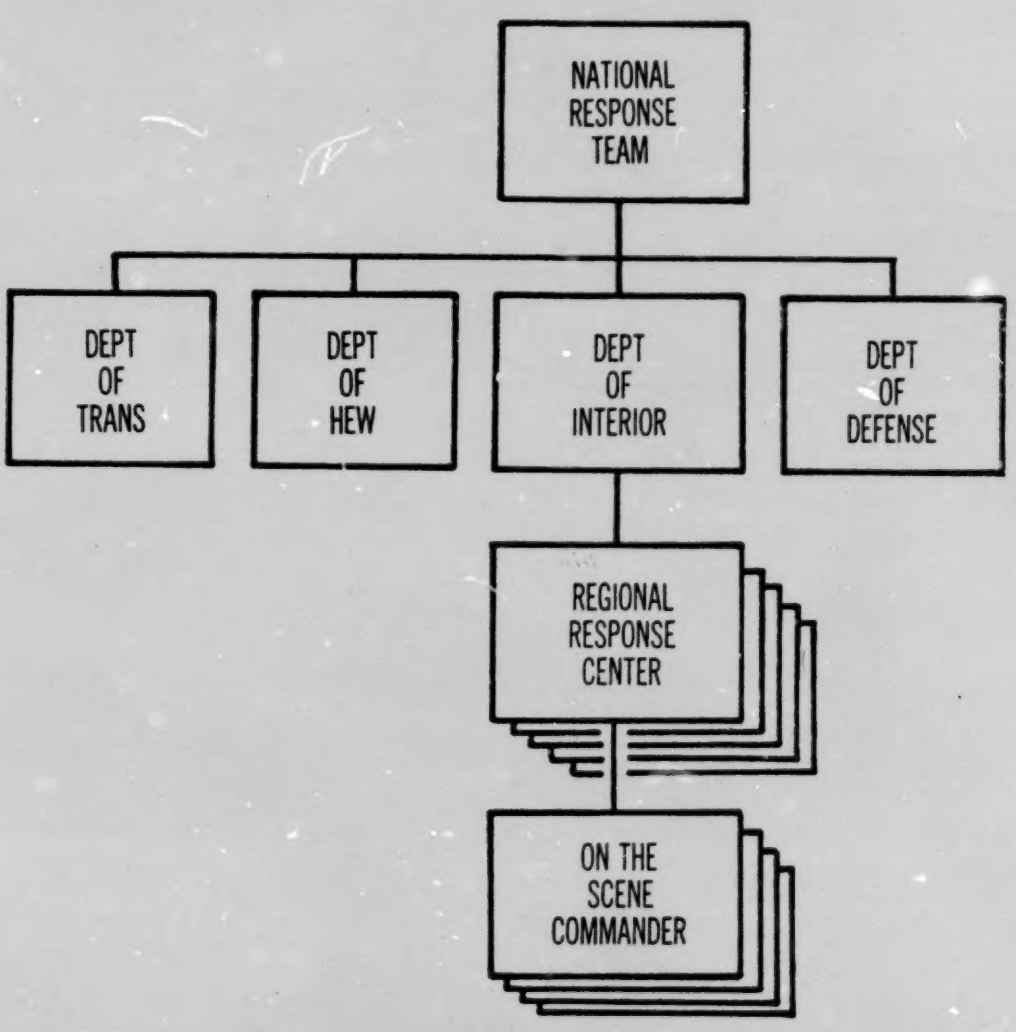

Figure 2. Federal organization for oil pollution control.

the response capabilities of the region in which it occurs, involves national security, or presents a major hazard to a large number of persons or a large amount of property. Any advisory agency may, by request to NRT, have a representative present when the NRT is activated to respond to a spill. When activated, the NRT performs the following functions:

(1) Monitors, evaluates, and insures the completeness of reports generated by the On-Scene Commander (OSC). For the consideration of the OSC, the NRT may recommend, through the RRT's a course of action in combating a spill. The NRT, however, has no operational control over the OSC.

(2) When necessary, requests other Federal, State, or local government or private agencies to provide, under their authorities, the resources necessary for combating a spill or for deploying personnel to monitor the handling of a spill.

(3) Coordinates actions of areas other than those affected by a spill to provide the RRT and OSC with required equipment, personnel, or technical advice.

(4) Acts as the focal point for national public information releases and for information transfers between the OSC and the Washington, D.C. headquarters of the agencies concerned. This procedure minimizes or prevents the dissemination of false and incomplete information.

9. REGIONAL RESPONSE CENTERS. Oil spill response activities for a region are conducted at the Regional Response Center (RRC). The location of the center is specified in the regional plan. RRC's provide communication stations for receiving and transmitting information relative to a regional oil spill and for reporting to higher headquarters the actions taken in response to the spill. RRC's maintain records of regional oil spill operations and furnish personnel to carry out the functions of the center.

10. ON-SCENE COMMANDER. The On-Scene Command (OSC) is responsible for the coordination and direction of Federal oil spill control efforts at the scene of a spill or potential spill. The OSC is designated in the regional plans. OSC's for inland navigable waters and their tributaries are provided by the Environmental Protection Agency. OSC's for the high seas, coastal and contiguous zone waters, Great Lakes, ports, and harbors are furnished by the U.S. Coast Guard. The OSC should take prompt action when an oil spill occurs. If he does not take prompt action, his functions are assumed by the Environmental Protection Agency or the U.S. Coast Guard, depending on the area involved. Additional responsibilities of the OSC are as follows:

a. Requests resources to contain the oil spill; directs countermeasures; and conducts cleanup, restoration, and disposal operations.

b. Provides support activities for recovery of damages and, when necessary, produces documentation to enforce this action. To carry out these functions, the OSC coordinates closely with the RRT to insure that the natural resources and environment are protected.

11. CONTINGENCY PLANS. Executive Order No. 11507, dated 5 February 1970, directs that all Federal agencies develop contingency plans for combating oil spills. Standards and policies for the plans are set by the Federal Water Pollution Act, the Federal Clean Air Act, and the Solid Waste Act. Development of the plans requires careful analysis of the current situation, determination of the possible sources of contamination, and a knowledge of the equipment availability and the need for capital expenditures. A model contingency plan is shown in appendix C.

a. CONTENT OF CONTINGENCY PLANS. Contingency plans should provide the following:

(1) A list of jobs and their priorities. Jobs must be assigned and authority designated before an oil spill occurs.

(2) Communication patterns to insure coordination of efforts.

(3) Reference materials.

b. MODIFICATION OF PLANS. Contingency plans must be modified from time to time as personnel change, as control and cleanup techniques improve, and as experience points to the need for further improvements. For this reason, the final plan adopted by a unit should be issued in looseleaf form to allow for deletions and additions as changes occur.

c. COMMANDER'S RESPONSIBILITY. The unit contingency plan should indicate that the commander, or his designee, of any Army-controlled facility within the region will be designated as the OSC for pollution incidents occurring within the commander's graphical area of responsibility for pollution incidents caused by an Army-owned or operated vessel.

12. RESPONSE PHASES. The response phases for the Federal five-phase system for oil spill control operations are as follows:

a. PHASE I, DISCOVERY AND NOTIFICATION. Any person discovering an oil spill should immediately notify the officer in charge, noncommissioned officer in charge, or the person in charge. All personnel using the facility should know the procedures for transmitting reports. The following information should be transmitted as part of the alert procedure:

(1) Time the spill occurred or was first observed.

(2) Where the spill occurred and the present location if the spill is moving.

(3) Type of oil spilled.

(4) Estimate of the amount of oil spilled or the rate of release.

(5) Environmental conditions, such as wind direction and speed, wave action, and currents.

(6) Name of craft, the registry, owner or consignee, deadweight tonnage, and draft if the spill occurred from barges or vessels.

(7) Description of the area that is likely to be affected, such as river banks, beaches, properties, wildlife areas.

(8) Cause of the spill, if determined.

(9) Action being taken to combat the spill, if any.

(10) Agencies or persons that have been notified.

Note. Any person who is connected with an oil spill and who fails to notify the proper authorities can be fined $10,000 or imprisoned for one year.

b. PHASE II, CONTAINMENT AND COUNTERMEASURES. This phase includes defensive actions taken as soon as possible after a spill has been discovered and reported. Containment and countermeasures include the following:

(1) Locating the source of the spill and stopping the flow of oil.

(2) Preventing the oil from spreading through the use of chemicals or equipment.

(3) Controlling the flow of water from upstream impoundments and preventing it from entering the contaminated area.

(4) Using barriers to protect threatened areas from contamination.

(5) Monitoring public health protection activities.

c. PHASE III, CLEANUP AND DISPOSAL. This phase includes actions taken to collect oil spilled on water by using sorbents and skimmers, to remove oil from beaches by bulldozing or tilling the soil, and to dispose of the oil collected in a manner that will not pollute the environment further. Cleanup and disposal methods are covered in section III.

d. PHASE IV, RESTORATION. This phase includes action taken to restore the environment to the same condition that it was in before the oil spill occurred, such as replacing soil, relandscaping, and resodding areas. Restoration criteria are established by State and Federal requirements and by property owners.

e. PHASE V, RECOVERY OF DAMAGES AND ENFORCEMENT. This phase includes litigations for the recovery of damages by property owners and the enforcement of pollution control laws. This phase does not usually apply to government-operated facilities.

SECTION III

CLEANUP AND DISPOSAL

13. CLEANUP METHODS. During the past few years, a number of methods have been developed for cleaning up spilled petroleum. The method selected should depend on the nature and quantity of the spill and the health and environmental hazards caused by the spill. Cleanup costs vary; however, the cost involved is secondary in importance to the containment and cleanup of the spill. Cleanup methods that may be used are as follows:

a. FLOATING BOOM. Floating booms may be used to contain a spill and prevent it from spreading (fig. 3). This method can only be used on inland waterways, harbors, and quiet water areas. Construction methods for floating booms may vary from locally constructed rigs (fig. 4) to commercial variations (fig. 5). However, consideration must be given to the flow velocity to determine the skirt length, the wave action to determine the boom diameter, and the ease of deployment. Once the oil has been contained by the floating boom (fig. 6), it can be recovered by skimming (fig. 7), by using suction pumps and piping (fig. 8), or by using skimming boats (fig. 9).

b. CHEMICALS. Chemicals should not be used to emulsify, disperse, or precipitate oil when the protection or preservation of a fresh water supply source, shellfish or finfish and their harvesting grounds or passage areas, or beaches is of prime concern. Chemicals should be used only in those surface water areas and under those circumstances when preservation and protection of water-related natural resources are not of the highest priority. Chemical agents cannot be used unless approved by the OSC in accordance with Annex X National Contingency Plan.

(1) CONDITIONS FOR USE. Chemicals may be used to treat a floating oil spill under the following conditions:

(a) When the spill presents fire or safety hazards.

(b) When large numbers of waterfowl may perish because of the proximity of the floating oil.

(c) When a "polishing" or final cleanup of light slicks of oil is necessary after the oil has been mechanically removed.

(2) TYPES OF CHEMICALS USED. The types of chemicals that may be used to clean up an oil spill are as follows:

(a) DISPERSANTS. Dispersants serve to enlarge the surface area of the spill. This scatters the oil globules throughout the volume of water and aids in dissipating the oil. A disadvantage of using dispersants is that they add chemical pollution to the water.

(b) FLOATING ABSORBENTS. Materials with oil attracting and water-repelling characteristics such as mulched straw, sawdust, sand,

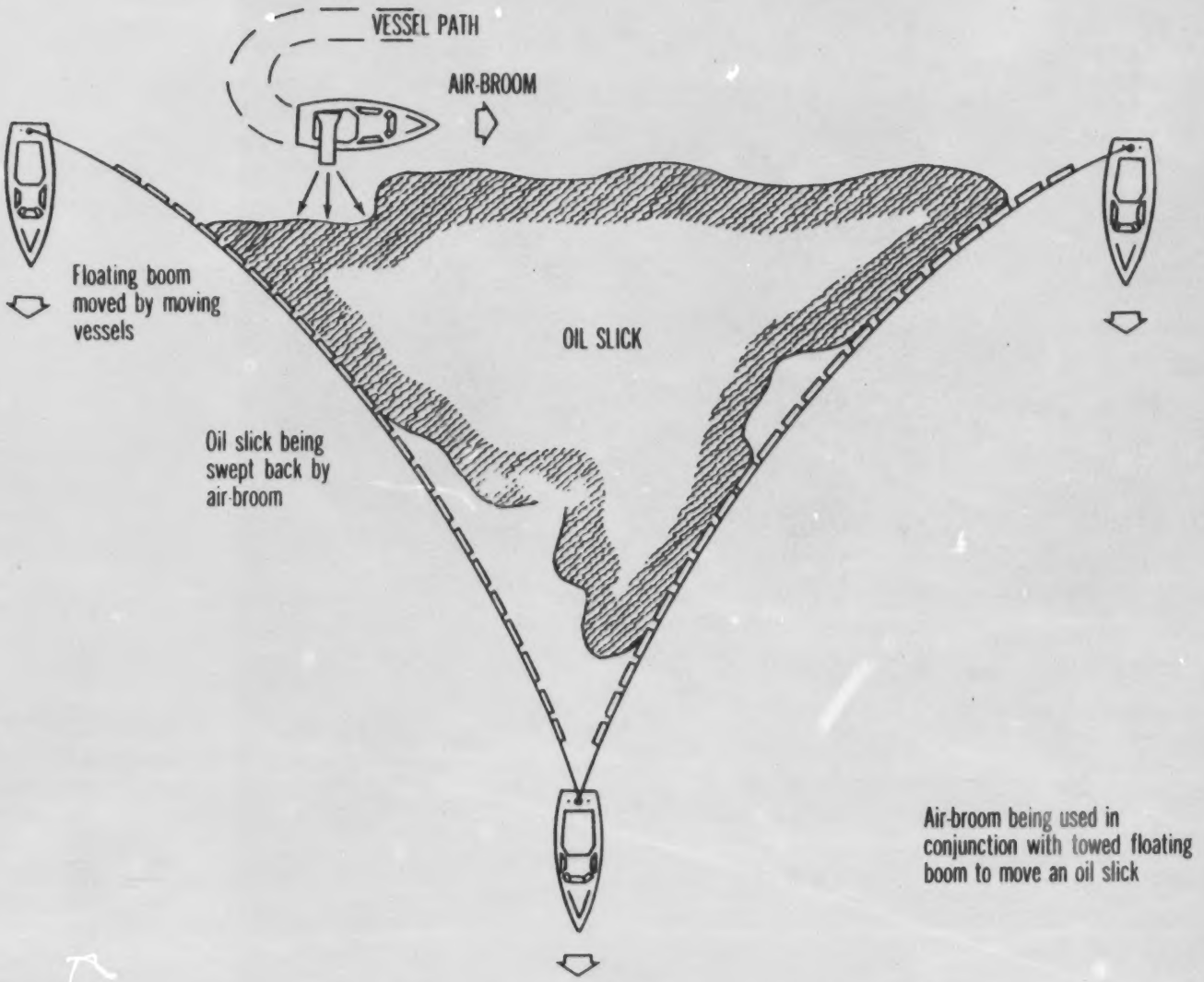
VESSEL PATH
AIR-BROOM
Floating boom moved by moving vessels
OIL SLICK
Oil slick being swept back by air-broom
Air-broom being used in conjunction with towed floating boom to move an oil slick

Figure 3. Contained oil slick being moved by air sweep.

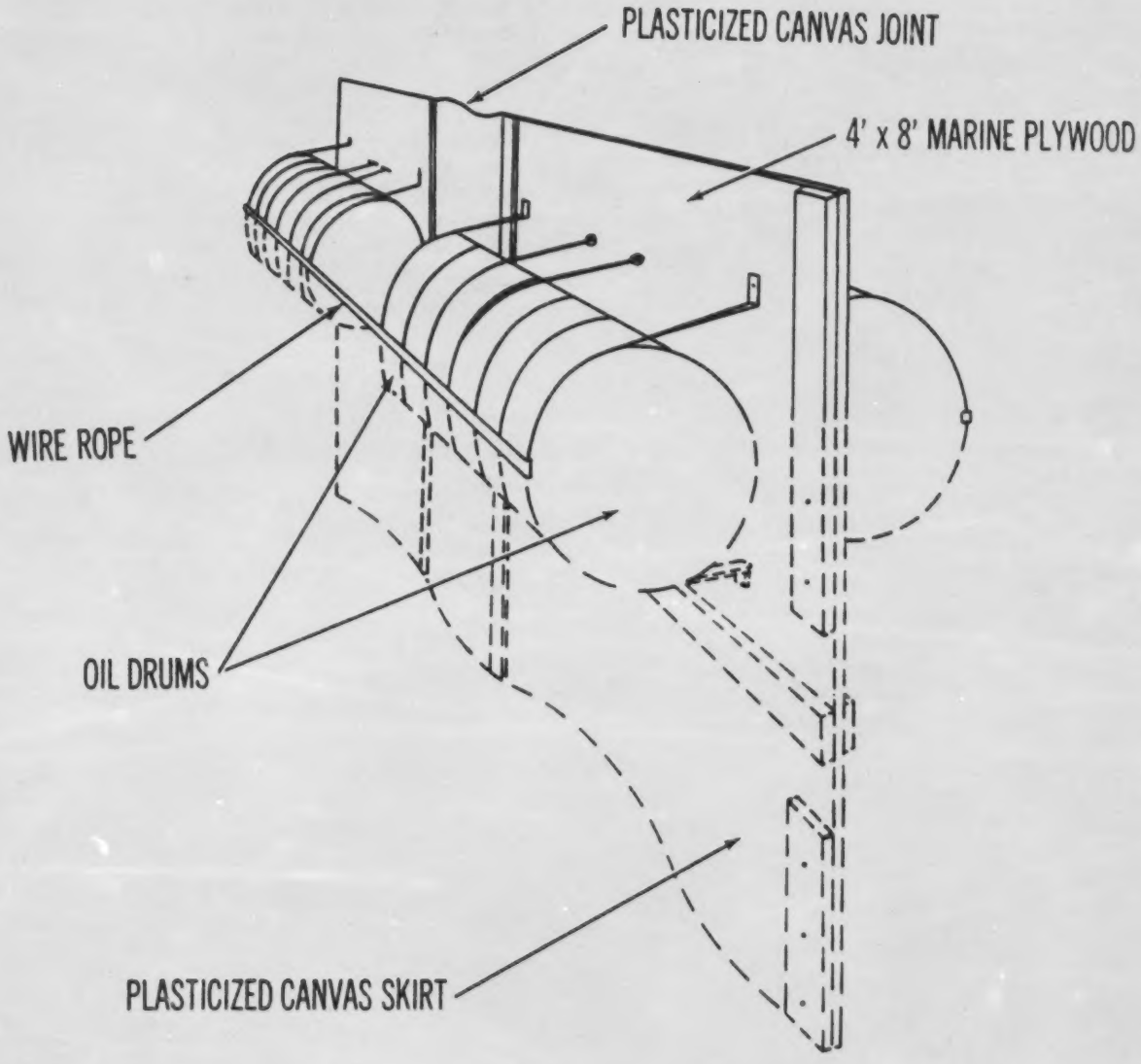

Figure 4. Locally constructed floating boom.

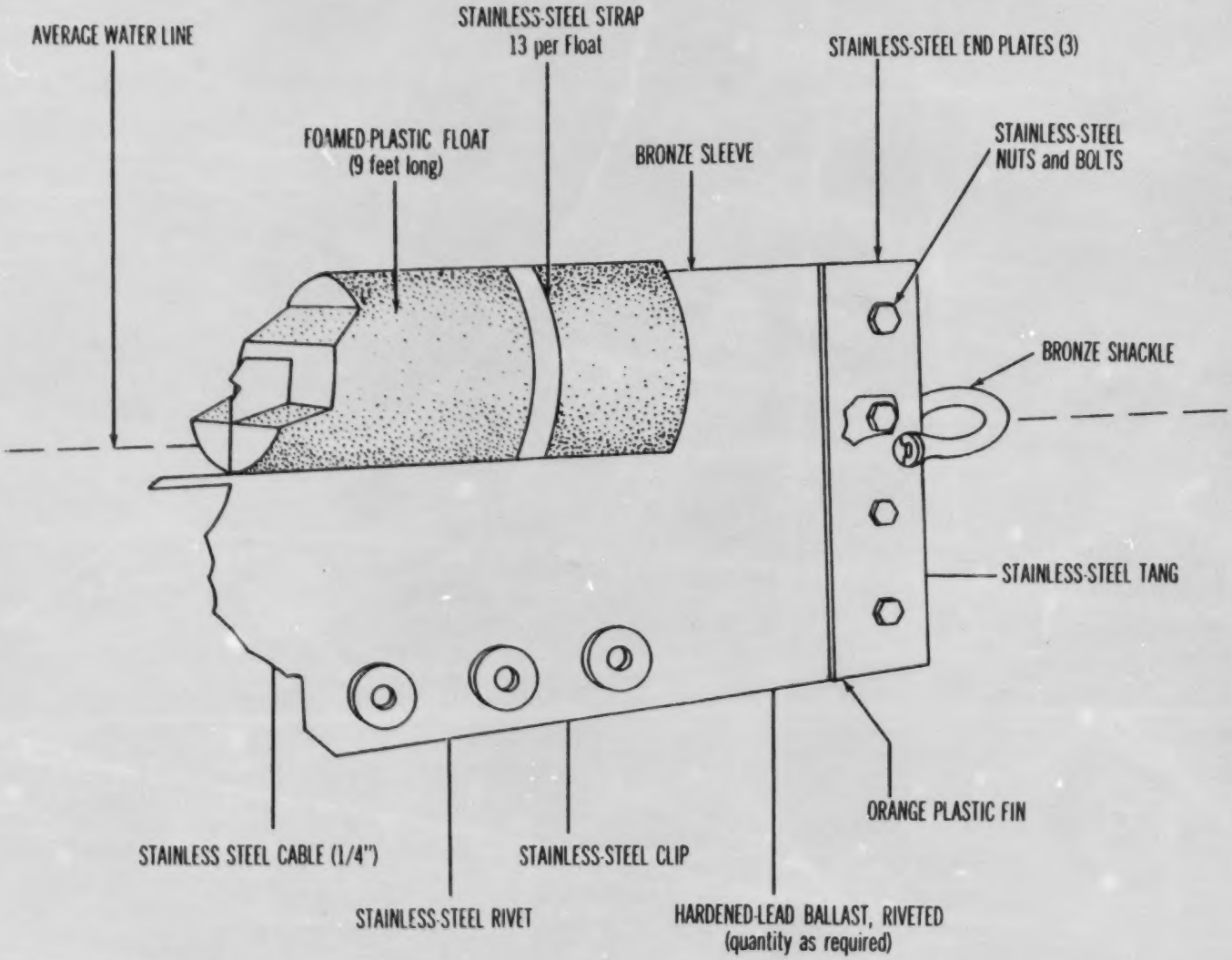

Figure 5. Commercial variation of floating boom.

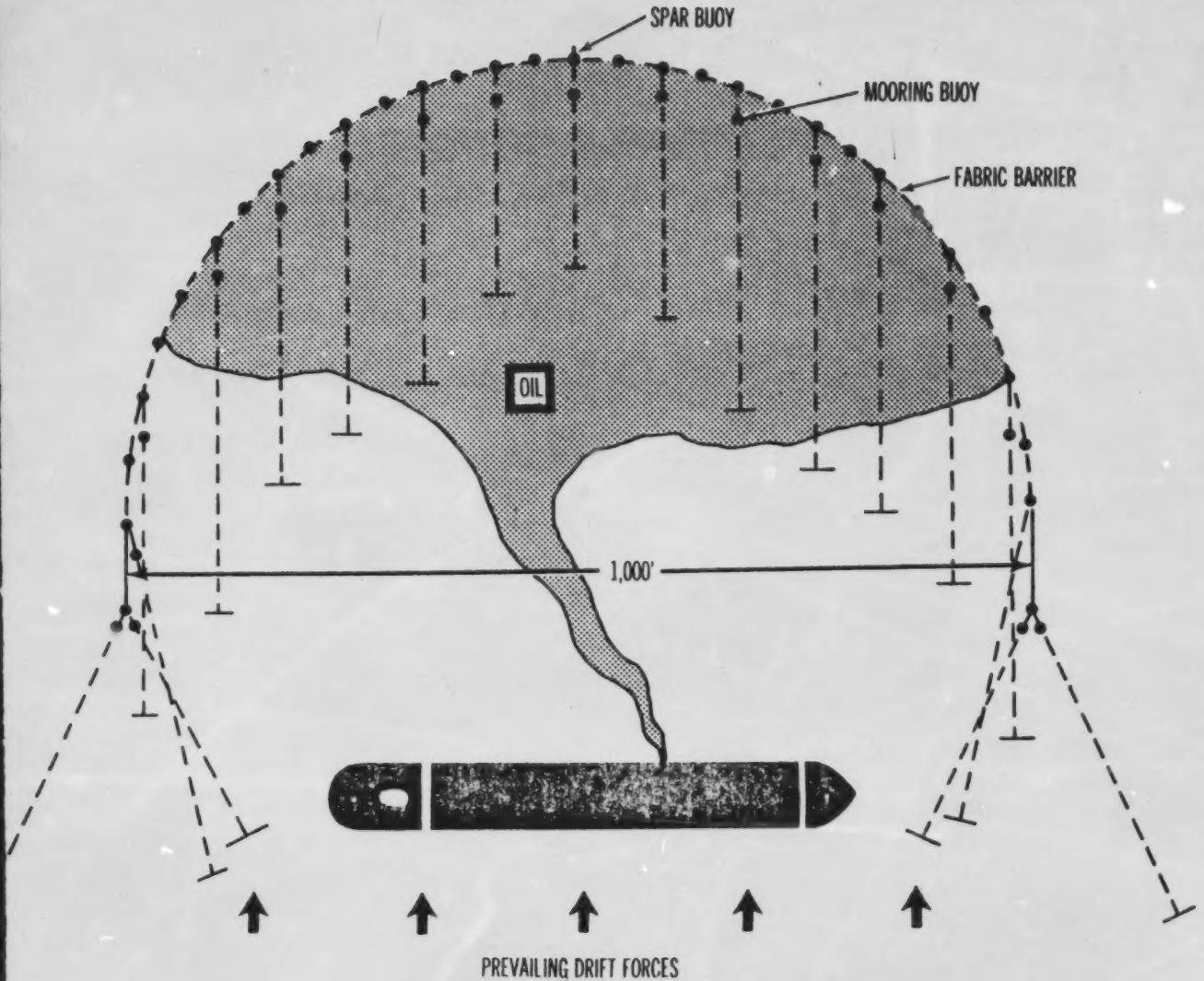

Figure 6. Containment of an oil spill.

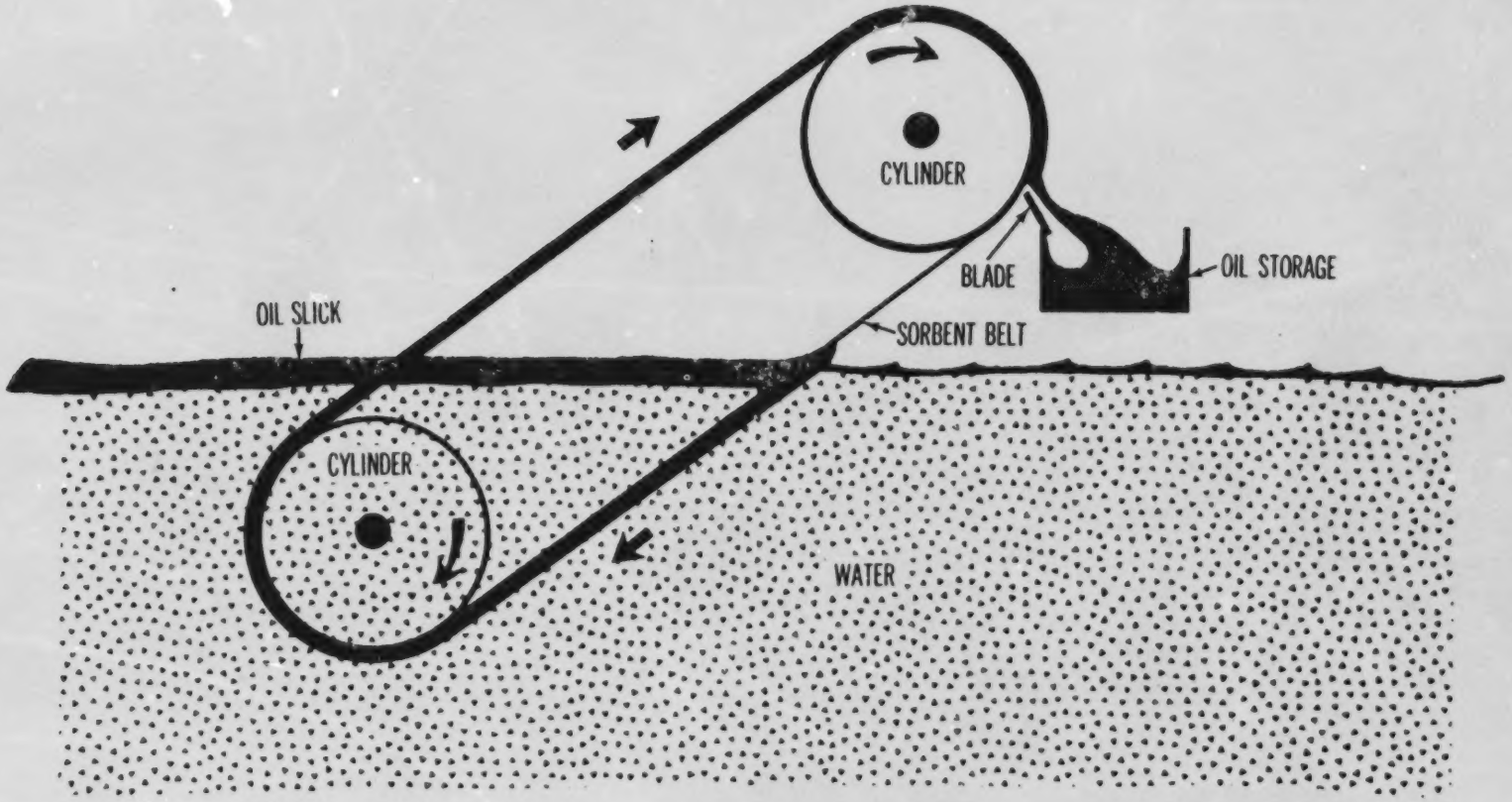

Figure 7. Belt-type oil skimmer.

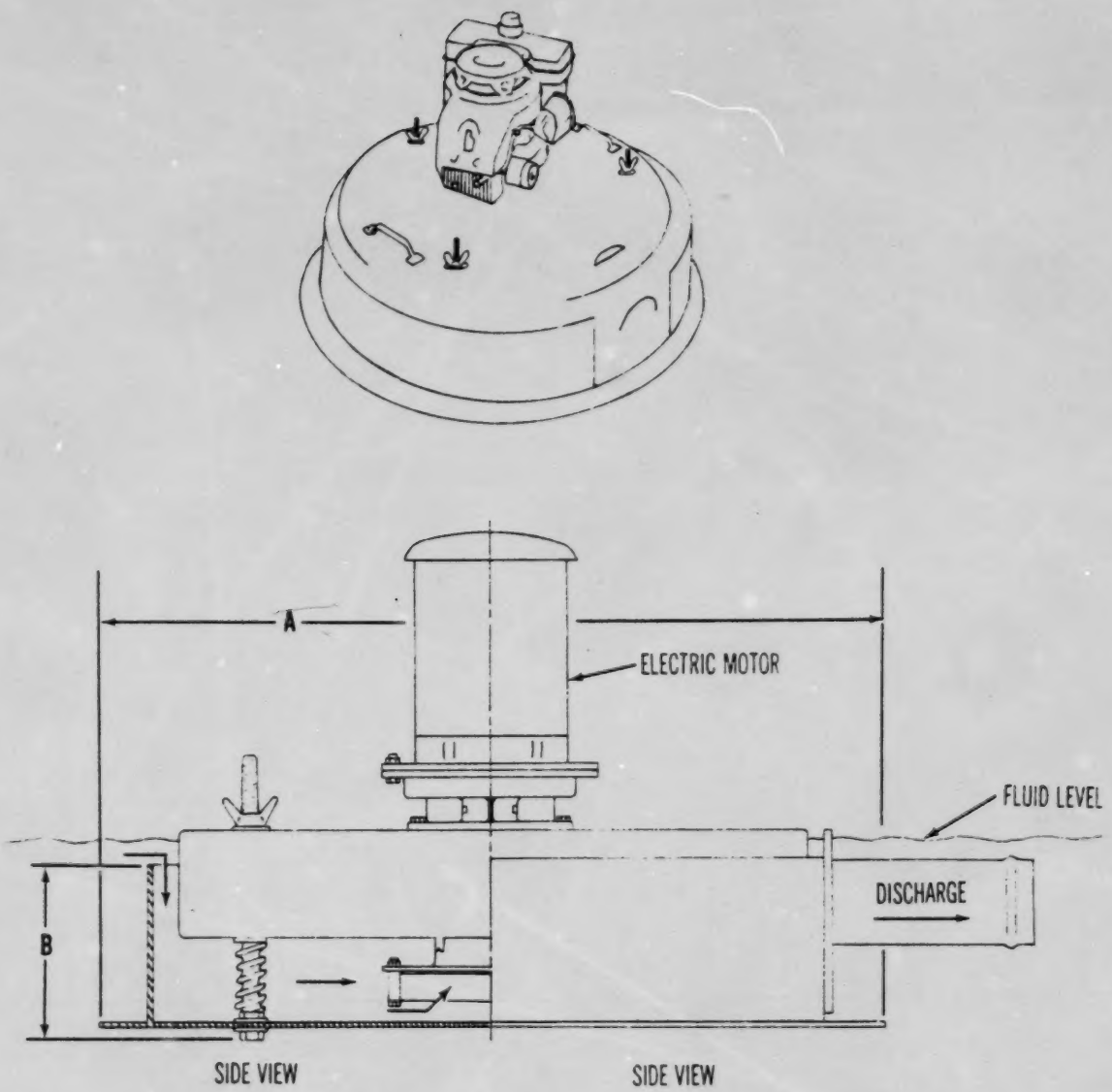

Figure 8. Floating saucer--water and sludge pump.

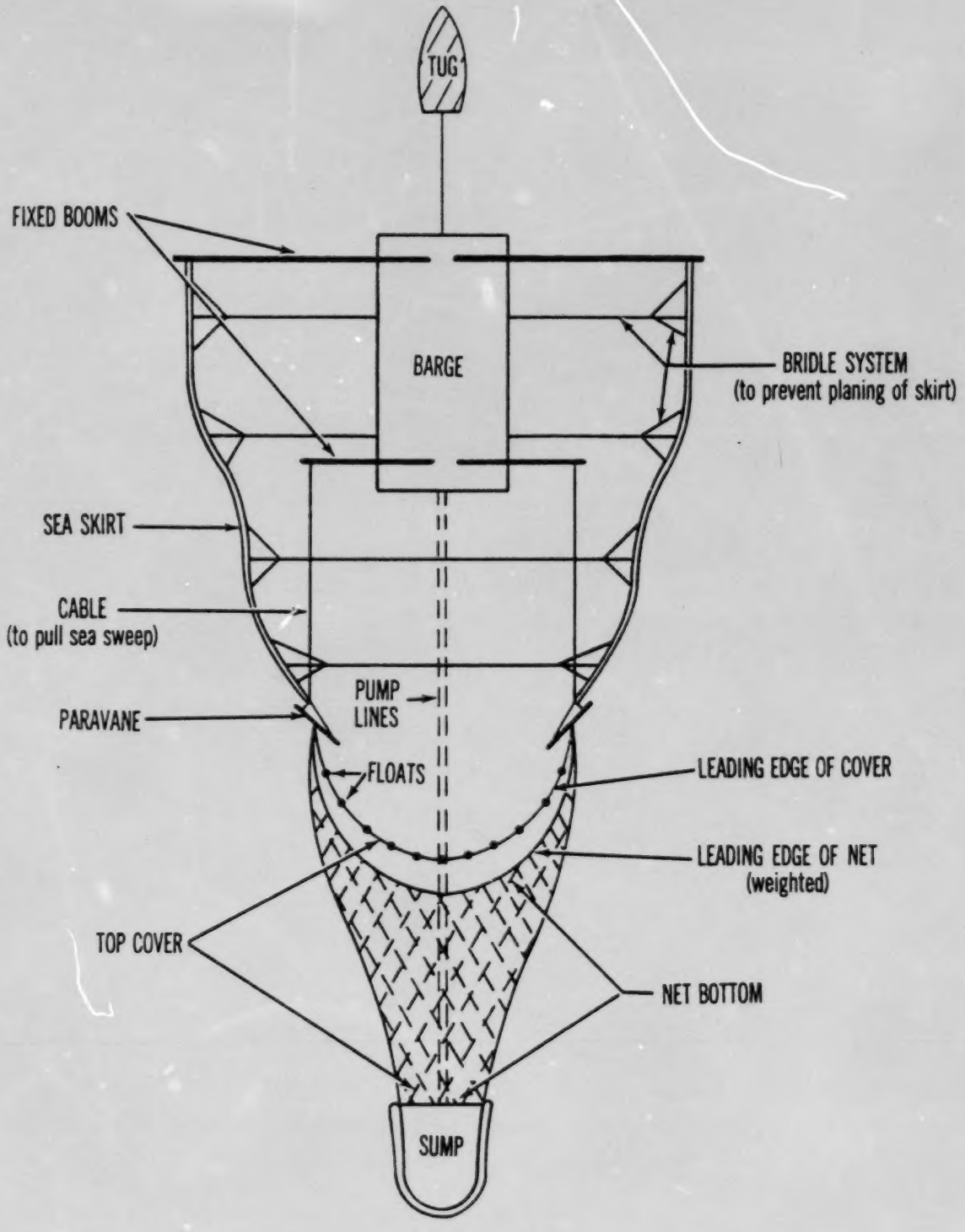

Figure 9. Skimming rig used to recover floating oil.

polyurethane foam, and hay may be used to absorb spilled oil. Sawdust and sand are used primarily on land-type spills, and mulched straw, hay, and foam are used on water spills. When mulched straw or hay is used, it must be removed from the shores. When foam is used, it is passed through a wringer-type device to remove the oil that has been absorbed. The use of this method presents the problem of distributing the sorbents and collecting and disposing of the oily mass.

(c) SINKING AGENTS. Sinking agents adhere to the oil and in time absorb it, causing the oily mass to sink to the floor of the water. This oily mass is harmful to the bottom aquatic life and poses a problem in using these chemicals.

(d) GELLING AGENTS. Gelling agents may be applied to the surface or external boundary of an oil spill to contain the spill and produce a cohesive effect on the oil. This method has been used successfully in quiet waters; however, the gelled mass must be removed.

(e) BURNING AGENTS. Burning agents aid in the combustion of the spilled oil and may be used in areas distant from shorelines or valuable property. Consideration must be given to the harmful effects of air pollution resulting from the combustion as opposed to the harmful effects of water pollution from the oil spill.

(f) DETERGENTS. Detergents may be used in cleaning beaches and contaminated soils; however, they cause chemical pollution.

c. AIR BUBBLES. Air bubbles can be used to contain an oil spill (fig. 10) by pumping air through perforated submerged piping in calm waters.

d. MECHANICAL EQUIPMENT. Oil pollution on sandy beaches may be removed by using mechanical equipment to skim off the top layers of the sand or soil. For rocky shorelines, warm water and hydroblasting have been used successfully.

14. RECOVERY AND DISPOSAL OF WASTE OIL. Oil that has been recovered from the water and shore areas presents another problem. If it is disposed of near a drainage area, the next rain could return the pollutant into water supplies and fishery grounds. If it is buried, water supplies could become contaminated. Farmland can also become affected by improper disposal. Because of these problems, measures are being sought to recycle the oil for use after it has been collected rather than to dispose of it. In many cases, however, recycling may not be possible because of the difficulty in separating the oil from the water or soil.

a. RECOVERY METHODS. Processes used to separate the constituents and recover the oil are as follows:

(1) GRAVITY SEPARATION. In gravity separation, an American Petroleum Institute separator is used. In this process, the sludge and solids drift to the bottom and the oil floats. The water is subjected to further treatment.

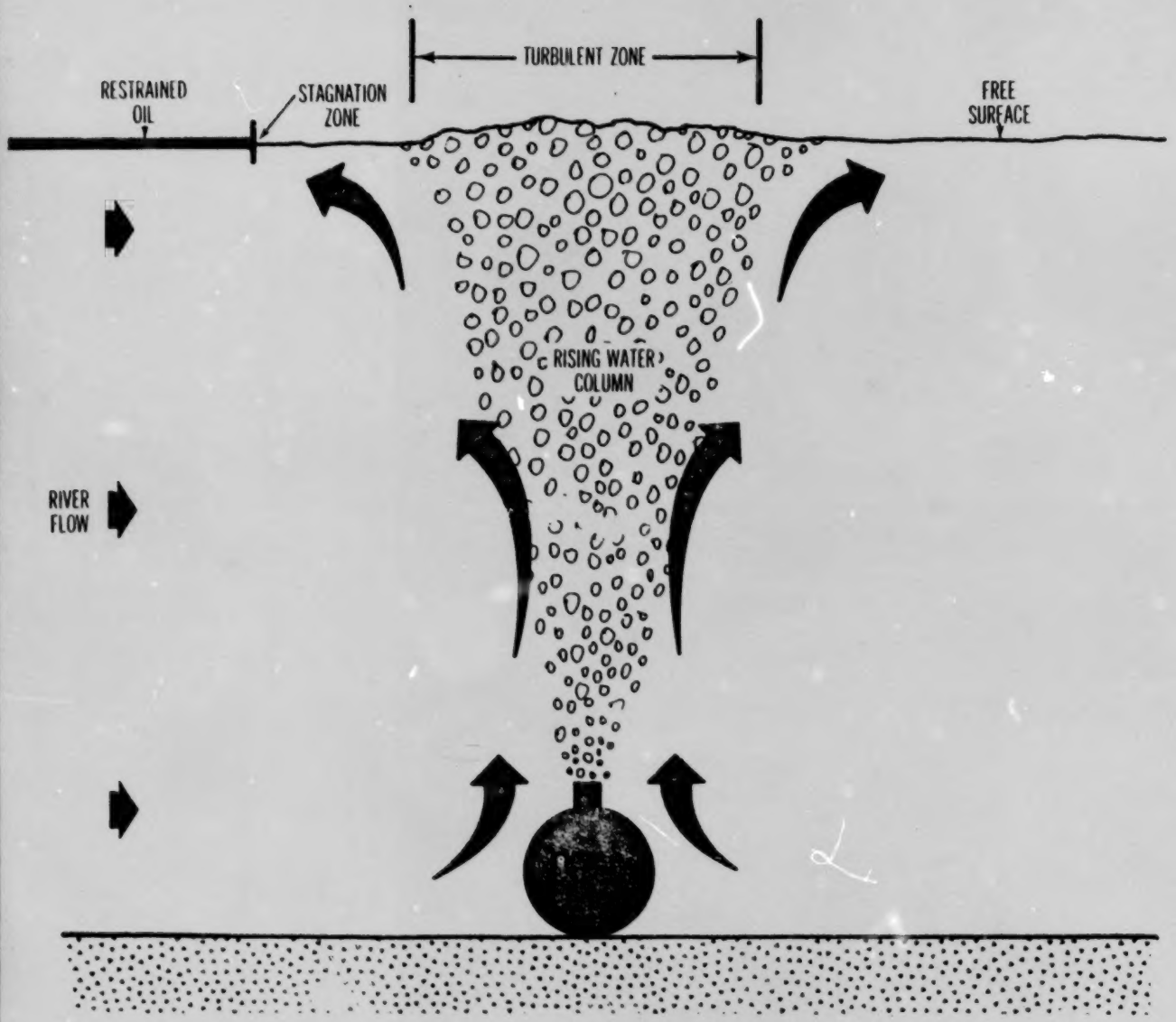

Figure 10. Containment of oil spill by use of air bubbles.

(2) COAGULATION. This process involves the removal of fine suspended oil particles by means of air bubble streams or chemical coagulants.

(3) FILTRATION. Particles of suspended oil are trapped by filtering through sand beds.

(4) BIO-OXIDATION. Bio-oxidation is a process by which organisms which metabolize oil are used to consume microscopic sized particles of oil. Generally, this process is used in conjunction with oxidation ponds.

b. SLUDGE DISPOSAL. Generally, the accepted method used to dispose of sludge is to remove the water from the sludge and either incinerate the residue or use it as fill material. Three techniques may be used to remove the water from sludge.

(1) PERCOLATION. The sludge is placed in shallow, open beds, and the water is allowed to percolate through the soil.

(2) VACUUM FILTRATION. A vacuum pump is used to vacuum the water from the sludge.

(3) CENTRIFUGING. The sludge is placed in a centrifuge and spun until the water is removed.

Note. The above methods should not be used to dispose of leaded sludge because the lead presents additional contamination problems. Leaded sludge will be disposed of in accordance with American Petroleum Institute's Recommended Practices for the Disposal of Leaded Sludge AR 11-21 and TM 10-1109.

c. POLLUTION REMOVAL. The method of combination of methods used to remove pollution or polluted soil from shore areas must be determined on the site, based on the availability of equipment and disposal sites. The following methods may be used:

(1) MECHANICAL TILLING. Mechanical tilling may be used to expose deeply contaminated soil.

(2) PLOWING UNDER. Contaminated soil may be plowed under or buried.

(3) PHYSICAL REMOVAL. The contaminated layer of soil may be physically removed for disposal in another location.

(4) BULLDOZING. In some cases, it is possible to use a bulldozer to skim off a surface layer of contaminated soil. Usually, the soil is bulldozed into windrows and then removed. On ocean shorelines, the polluted soil is bulldozed up to an area that is below the high tide mark. The soil is deterged, and the disposal job is finished when the tide rises.

(5) PLANNED POLLUTION. In the disposal of recovered products, careful analysis should be made of disposal methods to insure that they do not create further pollution or merely transfer pollutants from one area to another. In

some cases, however, the method of disposal may force planned pollution of selected environmental areas. It must be decided which small area will be unavoidably polluted to prevent pollution of a much larger uncontrolled area.

15. AFTER-ACTION REPORT. Following the occurrence of an oil spill, implementation of the contingency plan, and completion of the five response phases, an after-action report should be submitted by the OIC of the facility to the commander. The report should give a step by step accounting of what took place and should include information on the origin of the spill, volume of oil involved, methods of cleanup used and results obtained. A careful analysis of the situation to aid in preventing future occurrences and suggested amendments to the contingency plan should also be included. An extract from the after-action report on the Golden Gate oil spill is in appendix D.

APPENDIX A

REFERENCES

C1, AR 11-21	Environmental Pollution Abatement
AR 55-8	Transportation and Travel: Transportation of Biological Materials
AR 360-43	Army Information: Information Guidance, Nuclear Accidents, and Nuclear Incidents
AR 385-14	Safety: Accident Reporting Procedures, Army-shipped Non-nuclear Explosives and Dangerous Articles Transported by Commercial Carriers
AR 415-22	Construction: Protection of Petroleum Installations and Related Facilities
TM 10-1101	Petroleum Handling Equipment and Operations
MIL-HDBK-201A	Military Standardization Handbook, Petroleum Operations

Information and Procedures for Significant Spills of Oil and Other Hazardous Materials into the Water Environment (USDI-FWPCA)

Chemical Data Guide for Bulk Shipment by Water (U.S. Coast Guard, CG-388)

Handbook of Toxicology (National Academy of Sciences/National Research Council)

Natural Disaster Manual for State and Local Applicants (OEP Circular 4000, 4, 1963)

Federal Disaster Assistance (A Pocket Guide to Disaster Help) (OEP Pamphlet).

Current Regional Oil and Hazardous Materials Pollution Contingency Plan

Disaster Plans from Regions, Districts, or Facilities of Signatory Agencies, as appropriate

Oil Spillage Study, Literature Search and Critical Evaluation for Selection of Promising Techniques to Control and Prevent Damage (Battelle Memorial Institute, Richland, Washington, 1967). (Copy can be obtained by ordering AD-666289 from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va 22151, price $3.00)

Character and Control of Sea Pollution by Oil (American Petroleum Institute, October 1963, 1271 Avenue of the Americas, New York, NY 10020)

Manual for the Prevention of Water Pollution During Marine Oil Terminal Transfer Operations (American Petroleum Institute, 1964)

Policy on the Use of Chemicals to Treat Floating Oils (USDI/FWPCA). (Reprinted in October 1968 issue of the Post Engineer Items of Interest.)

APPENDIX B

FEDERAL WATER QUALITY ADMINISTRATION REGIONAL OFFICES

Region	States included*		Regional office addresses
Northeast	Connecticut Delaware Maine Massachusetts New Hampshire	New Jersey New York Rhode Island Vermont	John F. Kennedy Federal Building Boston, MA 02203 Phone: 617-223-7210
Middle Atlantic	Maryland North Carolina Pennsylvania	South Carolina Virginia District of Columbia	918 Emmet St. Charlottesville, VA 22901 Phone: 703-296-1376
Southeast	Alabama Florida Georgia	Mississippi Tennessee Puerto Rico Virgin Islands	1421 Peachtree St. NE., Suite 300 Atlanta, GA Phone: 404-526-5727
Ohio Basin	Indiana Kentucky	Ohio West Virginia	4676 Columbia Parkway Cincinnati, OH 45226 Phone: 513-871-6200
Great Lakes	Illinois Iowa Michigan	Minnesota Wisconsin	33 East Congress Parkway Chicago, IL 60605 Phone: 312-353-5250
Missouri Basin	Colorado Kansas Missouri Nebraska	North Dakota South Dakota Wyoming	911 Walnut St. Kansas City, MO 64106 Phone: 816-374-5493
South Central	Arkansas Louisiana New Mexico	Oklahoma Texas	1402 Elm St. Dallas, TX 75202 Phone: 214-749-2161
Southwest	Arizona California Hawaii	Nevada Utah Guam	760 Market St. San Francisco, CA 94102 Phone: 415-556-5876

*States listed by major portions only, as assigned to regions.

Region	States included*		Regional office addresses
Northwest	Alaska Idaho Montana	Oregon Washington	Room 501, Pittock Block Portland, OR 97205 Phone: 503-226-3915

APPENDIX C

A MODEL
OIL SPILLS CONTINGENCY PLAN

Prepared by the
Subcommittee on Oil Spills Cleanup
Committee for Air and Water Conservation
American Petroleum Institute

COMPANY OIL SPILLS CONTINGENCY PLAN MANUAL

Contents

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PREFACE

The following document is designed to help any organization develop an in-house Oil Spills Contingency Plan for dealing with oil spills emergencies. It is neither a "master plan" nor an "ideal plan." Rather, it is a framework, with generalized language, which can be utilized for the construction of a plan suited to a company's specific organizational needs.

The purpose of a company Oil Spills Contingency Plan is fourfold:

(1) To provide a list of jobs that must be done when oil is spilled, with some indication of priority and importance.

(2) To provide for the assignment of such jobs prior to an oil spill, with appropriate designation of authority.

(3) To provide communication patterns to assure coordination of efforts.

(4) To provide reference materials that might be useful to those responsible for the various duties that occur as the result of a spill.

The plan will require modification from time to time, as personnel change, as technologies advance, and as experience dictates improvements. For this reason, the final plan adopted by a company might be issued in a binder that allows for the deletion and addition of sheets.

It would be desirable to have the plan reviewed at least twice yearly to assure that it is up to date. The company Oil Spills Task Force described in this plan might provide such a review.

It is suggested that the Oil Spills Contingency Plan be limited to materials that help personnel solve the problems that arise from spills. The addition of extraneous material will tend to make the manual less useful when it is needed most, when oil is already on the water. For the same reason, it is suggested that generalized statements of management concern for the appropriate handling of oil spills be limited to an introductory section or to an appendix.

INTRODUCTION

Major oil spills can generate complex technical, legal, and public relations problems for the company. It cannot be emphasized too strongly that the best way to handle oil spills is to prevent their occurence. Good housekeeping, adequate equipment maintenance, and adherence to proper operation procedures are the best insurance against oil spills.

If, in spite of the best care, accidental spills do occur, they will require the immediate coordination of efforts of many company divisions and, perhaps, the assistance of outside agencies.

This Oil Spills Contingency Plan is designed to help company personnel respond quickly and effectively to the problems presented by accidental spills. Its primary goal is to limit, as far as practicable, damage to property, wildlife, or the ecology from such a spill.

Within this Oil Spills Contingency Plan Manual, you will find descriptions of the duties that are to be discharged when oil is spilled. It provides affected personnel with procedures for handling such spills effectively.

Some of the procedures are mandatory, and they are so identified. Others are merely suggested, as their application might be dependent on the conditions of the spill.

The cleanup techniques described in the annexes are subject to modification as technology improves.* Additions and revisions, which will be provided from time to time, should be added to the Manual to keep it up to date.

* Each individual company will necessarily have to develop and establish cleanup techniques adapted to the conditions and the locale in which its operations are conducted.

ALERT PROCEDURE

This alert procedure will become effective immediately upon the observance of an oil spill from a company installation of any kind which could possibly pollute shorelines, coastal or inland waters, or the open sea, or which could damage, foul, or endanger any property or wildlife onshore or offshore.

Internal Alert Procedure

1. **Any company employee** observing an oil spill of any quantity must immediately notify his supervisor. (Mandatory notification.)

2. **The supervisor** will confirm the spill, its cause and basic nature, and notify the manager responsible for the department concerned. (Mandatory notification.)

3. **The manager** will make a preliminary determination of the seriousness of the spill and, at his discretion, notify:

   A. The vice president or senior executive of his department.

   B. The company coordinator of air and water conservation or other specifically designated person.

4. **The coordinator of air and water conservation** will alert the corporate Oil Spills Task Force by notification of the following:

		Phone Numbers OFFICE	HOME
A.	Manager, Public Relations Department	_____	_____
B.	Manager, Legal Department	_____	_____
C.	Manager, Insurance Department	_____	_____
D.	Others as designated	_____	_____

External Alert Procedure

Managers, or designated supervisors, will notify the following outside agencies immediately after they have notified the senior executive of their department:

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		Phone Numbers
1.	*U.S. Coast Guard--Rescue Center (24 hours daily)	_____
2.	U.S. Coast Guard--Captain of the Port	_____
3.	**U.S. Geological Survey (offshore)	_____
4.	Port Authorities	_____
5.	***Directors of Oil Spills Cooperatives	_____
6.	Fire Department	_____
7.	State Stream Control Commission	_____
8.	State Conservation Commission (Oil & Gas Board, etc.)	_____

* In conformity with the National Multiagency Oil & Hazardous Material Contingency Plan, the U.S. Coast Guard has agreed to notify all Federal and certain State and local agencies when spills are reported. Check the Coast Guard list in your area to be positive that all agencies interested are notified.

** To be notified by all operators of other Continental Shelf leases, in additon to the Coast Guard, regardless of note above.

*** Cooperative programs for the cleanup of oil spills are in existence in a number of harbors and port areas around the U.S. Such programs allow for the pooling of equipment, supplies, and manpower, insuring a more effective response to oil spills problems. Participation in such local cooperative programs is encouraged as a matter of company policy.

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Information to be transmitted as part of the alert procedure:

1. Time spill occurred or was first observed.
2. Where spill occurred and present location if moving.
3. Type of oil spilled.
4. Estimate of amount spilled or rate of release if continuing.
5. Environmental conditions--such as wind direction and speed, wave action, and currents.
6. If from barges or vessels, name of craft registry, owner or consignee, deadweight tonnage, and draft.
7. Description of area likely to be affected--such as river banks, beaches, properties, wildlife areas.
8. Cause of spill, if determined.
9. Action being taken to combat spill, if any.
10. Agencies or persons already notified.

ACTION PROCEDURE

Actions to control, contain, remove, and clean up oil spills are to begin whenever an oil spill is reported by any employee. The immediate responsibility for these actions rests with the ranking company employee on the scene. Responsibility will move to higher levels of management depending upon the size of the spill, the ability of local units to control it, and the potential for damage.

Levels of Responsibility

1. **Local supervisors** will be responsible for all spills within their areas which their local organizational units can handle without involvement of other company units or outside parties.

2. **Division or regional managers** will be responsible for larger spills whose size or nature indicates that they may escape beyond the local area or exceed the control capabilities of the local organizational unit. When such spills occur, regional managers will arrange for appropriate assistance from other company units and outside cleanup services, and from members of oil spill cooperatives, where established.

3. **Vice presidents or senior executives** will be responsible for extremely large spills where the possibility exists for extensive contamination of larger areas of water or shorelines or for damage to property or wildlife. Spills of major severity may require total company effort and close cooperation with government agencies.

Tanker Spills in Open Sea or Territorial Waters

If the spill involves no threat to any shore area, the general manager of the marine transportation department will designate the supervisor of the cleanup operations. If the spill is close to land, he may, in conjunction with general manager of the department operating the nearest land-based facility, designate a land-based executive as supervisor of cleanup operations.

If an executive of a land-based facility is assigned responsibility for cleanup operations resulting from a tanker operation or accident, the marine transportation department will make available to him a senior executive to advise on measures that might involve the safety, handling, or disposition of the ship or its cargo.

If the marine transportation department provides the executive responsibility for cleanup, a senior executive of the nearest land-based facility will be made available to insure coordination of efforts and full use of company resources.

OIL SPILLS TASK FORCE

A standing corporate Oil Spills Task Force will be designated to insure coordination of all company oil spill cleanup efforts. It will be so constituted that its members are free to devote their time to the handling of any major spill. They will have prior clearance for the necessary travel and expenses they may incur when the Task Force is called upon for assistance.

The task force will include as regular members:

1. A senior executive of the company, or his designee, whose department is likely to be responsible for the handling of the majority of oil spills.

   Name: _____

   Phone: _____

2. The coordinator of air and water conservation, or some designated person, to provide advice and technical assistance on cleanup procedures and to arrange for coordination with government agencies when appropriate.

   Name: _____

   Phone: _____

3. A representative of the legal department to provide counsel to protect the company's interest.

   Name: _____

   Phone: _____

4. A representative of corporate public relations to provide on-the-scene public relations assistance.

   Name: _____

   Phone: _____

The task force may include others on a temporary basis such as:

1. The local refinery or terminal oil pollution control coordinator, if such a coordinator has been appointed.

2. An insurance or claims adjuster to adjust claims promptly.

3. Representatives of medical, transportation, and communications departments, as appropriate.

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Regional or divisional task forces, similarly constituted, may be formed in designated areas upon the recommendations of the division heads or corporate headquarters.

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ADVANCE PREPARATIONS

Heads of all departments likely to be involved in oil spill operations are responsible for:

1. Advance assignment of personnel who might be needed in the event of a spill.

2. Clear definition and distribution of duties of personnel in the event of a spill.

3. Training and orientation of personnel with advance assignments.

4. Arranging for travel clearances, including passports, in advance of need.

The coordinator of air and water conservation will:

1. Provide an inventory of the company's personnel and equipment for dealing with major spills.

2. Provide a periodic review of the company's readiness for dealing with oil spills.

3. Distribute technical data and training materials to personnel who will be responsible in the event of a spill, and provide appropriate technical material for the appendixes of this manual.

PUBLIC RELATIONS

No statements regarding a spill will be made by any company employee except as follows:

1. **Immediately following a spill,** the ranking company official at the scene will be responsible for issuing simple statements of fact and no others.

2. **As soon as possible after a spill,** a single official spokesman for the company will be designated by the company official in charge, in consultation with company headquarters.

3. **Before any detailed statements are issued** regarding a major spill, they are to be cleared through the company official in charge and the Oil Spills Task Force, which will determine the accuracy of the statements.

The public relations officer on the scene will:

1. Set up communications facilities for news media.

2. Make any arrangements necessary to get local reporters to the scene of the spill or back to public communications facilities.

3. Provide regular briefings to press and government officials.

4. Monitor press and TV coverage and forward reports to corporate public relations.

5. Forward all written statements to corporate headquarters.

6. Transmit to corporate headquarters all verbal statements given to media "as reconstructed" as soon as practical.

Initial press statements should:

1. Give the name of the installation or vessel(s) involved, the time of the accident, the destination of the vessel(s), and any other facts that are not in dispute (such as the steps the company has taken to contain, control, or handle the spill).

2. State explicitly that it is the company's policy to prevent pollution of the sea, coastline, or inland waters--whatever is appropriate--and to minimize damage to property or the ecology.

As the following information becomes available, press statements should:

1. Note the containment and cleanup experts are (on) (being called to) the scene to supervise the operation.

2. Give the type of product spilled--light or heavy oil. Other.

3. Report whether the spill has been controlled.

4. Give the size of the spill--quantity and area affected.

5. Tell how spill is moving, and what factors can affect its movement, such as wind, current, and tides.

6. Describe cleanup measures that have been taken and planned--types and quantities of equipment being used and manpower involved.

7. Describe special efforts taken to protect property and wildlife.

No statements shall be made containing any of the following, unless cleared by corporate headquarters:

1. Speculations concerning liability for the spill or its legal consequences.

2. Speculations regarding the cause of the spill. An extended inquiry may be needed to determine the actual cause, and legal liability could be affected by what is said.

3. Estimates of damage expressed in dollars.

4. Estimates of how long cleanup will take or of cleanup costs.

5. Promises that property, ecology, or anything else will be restored to normal.

6. Opinions concerning the appropriateness of government response to the oil spill.

If incorrect statements or unfounded speculations are published, the following steps are suggested:

1. Provide the source with correct information. Arrange for representatives to fly over the spill, or otherwise visit it, to confirm company estimates as to size and damage.

2. Avoid direct rebuttal of erroneous statements; ask for amendments of incorrect details.

3. Do not rebut statements by scientists unless you use a comparable scientific source to back up any statement you make.

ANNEX 1

EQUIPMENT GUIDE

The following recommendations for equipment and supplies are only general guides to minimum needs. "The trouble potential" for accidental spills is as varied as the environmental and topographical conditions where petroleum products as handled.

Each manager of a company installation will have to evaluate the probability of spills of varying sizes occurring within his area of responsibility. After such evaluation, he should accumulate the equipment and supplies required to handle adequately the maximum serious spill a prudent man could anticipate.

Participation in local cooperative oil spill cleanup programs can help insure adequate supplies and equipment, and broaden the base of trained manpower available to handle the specialized equipment and supplies.

While the full resources of the company will be made available to managers facing catastrophic spills, it is expected that small or medium spills will be handled effectively at division and area levels.

Small spills are spills that should be handled by the installation itself without aid from other units or outside parties, utilizing equipment and manpower already in the vicinity of the spill. Basic equipment required would include: floating boom (200-500 feet), chemical dispersant (2-10 barrels), bales of straw (10-25), one small boat, one eductor or other means of agitation, one skimming device, handtools such as sprayers, rakes and pitchforks.

Medium spills are spills which may escape beyond the local area or exceed the control capabilities of the local organization, thereby requiring the assistance of other company units or third-party services. Where cooperative programs are established, they would be involved. Basic equipment required: floating boom (500-1,000 feet), chemical dispersant (10-20 barrels), bales of straw (25-100), small boats (2-4)--at least one powered, 1 straw blower, spraying equipment for dispersants, several means of agitation, such as boat propellers or fire hose, several skimming devices such as skimmer vessels, vacuum pumps and floating skimmers, handtools in sufficient quantity, waterside cleanup equipment (third party).

Large spills are spills which may possibly affect large water areas, shorelines, beaches, or other properties. They will require total company effort and possibly outside services. It may be expected that certain governmental agencies will become involved.

The quantities of some equipment required may range upward from that required for medium spills by factors of ten to twenty or more.

ANNEX 2

EQUIPMENT AND MATERIAL AVAILABLE

To be completed by each terminal or other installation on or near water. One copy to be sent to coordinator of air and water conservation and one copy to be kept in this manual.

Cooperative Cleanup Program

Name of Contact: _____ Phone: _____

Contractor Cleanup Services

Name: _____ Phone: _____

_____ _____

Equipment Available	Quantity/Length/Size	Source or Location
Booms, types _____	_____	_____
_____	_____	_____
_____	_____	_____
Skimmers _____	_____	_____
_____	_____	_____
_____	_____	_____
Vacuum trucks		
	_____	_____
	_____	_____
Collapsible storage containers, slop	_____	_____
	_____	_____
Fire hose and monitors	_____	_____
	_____	_____

Small Craft		
size_____	_____	_____
size_____	_____	_____
size_____	_____	_____
Barge-mounted vacuum equipment	_____	_____
	_____	_____
Dispersants		
type_____	_____	_____
type_____	_____	_____
type_____	_____	_____
Absorbents		
Straw_____	_____	_____
_____	_____	_____
Other_____	_____	_____
_____	_____	_____

OTHER ANNEXES

Additional annexes may include subjects such as:

1. A suggested press release, to be used by local managers in the event of spills when public relations counsel is not available. It will consist of a sample statement, with blanks for addition of basic data, such as date, place and nature of spill.

2. A suggested report form for all oil spills, to be completed after spill has been cleaned up. In addition to basic data about the spill, it will request: cause of spill and possible remedial action for prevention of future spills; cleanup techniques used and evaluation of them; public relations observations.

3. Technical material describing current oil spill cleanup practices and equipment. The material will include data on: containment, dispersal and sinking agents, physical removal from water, and cleanup of boats and shore installations.

4. Selected bibliography of material available on handling oil spills.

5. List of oil spill cooperative programs participated in by corporate units, and general policy statement for guidance of divisional and local managers regarding such cooperative programs.

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APPENDIX D

EXTRACT

AFTER ACTION REPORT

GOLDEN GATE OIL SPILL

JANUARY 1971

Note. The contents hereof are a series of speech outlines prepared by Standard Oil Company of California. They present in outline form some guidelines resulting from the cleanup of the Golden Gate Oil Spill in January 1971.

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CONTINGENCY PLAN AND ORGANIZATION

1. **WHAT IS A CONTINGENCY PLAN?**

   (a) Most people think of it as a book you dust off when you are in trouble.

   (b) It must be a way of doing business that creates a living, vital organization that is flexible and responsive to emergency needs. (A book summarizing the planning of the organization is an important tool.)

2. **MANAGEMENT RESPONSIVENESS:**

   (a) Support at all levels of management was available.

   (b) Company oil spill survey emphasized need for plan of action.

   (c) Previous emergencies had created awareness of potential problems.

3. **CONTINGENCY PLANNING:**

   (a) Emergency Book was developed to meet needs.

      (1) Call Out Lists--

      Emergency Numbers.
      System for calling using "ladder" principle.
      People "On Call" at all times to meet needs.
      Radio contact should telephone system fail.

      (2) Organization Charts--

      "Man-in-Charge" concept.
      Typical charts for various sizes of spills.

      (3) Emergency Equipment Inventory--

      Richmond Refinery
      Other Bay Area Refineries
      Outside Organizations

      (4) Equipment Suppliers--

      Night Telephone Numbers
      Sources of Equipment

(5) Maps and Charts--

Tide Tables
Charts and maps of Refinery, Pipelines, and
San Francisco Bay

(b) Emergency Training--

(1) Experience gained from other refinery emergencies.

Observation
Critiques
Training of Supervisors

(2) Hypothetical oil spill drills.

(3) Hypothetical studies--

Potential Spills vs. Equipment
System Analysis

(4) Training of mechanics to operate emergency equipment.

(5) Over-response to small emergencies. Training of supervisors.

(c) Equipment Available--

(1) Retriever oil cleanup boat.

(2) Boom.

(3) Emergency Trailers.

(4) Radio System.

(5) Standard Oil Skimmer.

(d) Staff Assistance.

4. **RECOMMENDATIONS--CONTINGENCY PLANNING:**

(a) Revise Emergency Book.

Update labor and equipment available.
Enlarge scope of maps.
Improve usefulness to others (road map).

(b) Prepare contracts with specific companies.

(c) Evaluate emergency equipment inventory--booms, skimmers, radios, etc.

(d) Improve equipment designs.

5. **ORGANIZATION:**

(a) What were the problems of organization.

(1) Land and sea problems.

(2) Large area.

(3) Communications.

(4) Time schedule.

(b) Creation of Long Wharf Headquarters.

(c) Decentralization--Established six field headquarters. Each headquarters completely self-contained.

(d) Organization Chart--

(1) Flexibility--Oil Spill is not stationary. Chart is illustrative only--Changed daily as nature of work changed.

(2) Simpler organization during dark hours. 24 hours/day, 7 days/week.

(3) Field Headquarters--Detailed description by Chuck Auerbach.

(4) Marine Operations--Initially from central headquarters. Switched to site for control.

(5) Role of "Spill Managers"--

Daily meetings
Hourly communication
Protection from detail

(6) Logistics Support.

6. **SUMMARY--ORGANIZATION:**

(a) Responsibility for action and decisions must be understood and accepted by someone.

(b) Person in charge must have authority to make decisions and take action.

(c) Organization plans must be flexible and changed frequently.

Non-performers must be moved promptly.
Supervisors trained in "people management" must be available.
Adjust organization to suit talents of supervisors available.

(d) Continuous communications are essential.

(e) Management of spill must avoid becoming lost in details--System is essential which makes sure details are handled.

(f) Daily strategy meetings are essential.

(g) The advice of consultants and specialists is invaluable and must be sought.

(h) Develop techniques for working with volunteers and ecology groups.

BEACH RESTORATION AND MANAGEMENT

1. **Personnel**

(a) **Utilizing Cleanup Consultants**--Thorough inventory of local services available needed. They have specialized knowledge with quick access to required disciplines. Their detachment is useful; they can research thoroughly and quickly. Non-company tag is useful. Avoid tying yourself to the "Consultant" who is trying to sell something.

(b) **Employ reliable contractors for heavy equipment and labor.** Frees beach commander from these logistic and administrative problems. They have specialized knowledge, knowing what is needed and where to find it. The right contractor keeps the job moving; fires inadequate personnel on the spot.

(c) **Utilization of Company Supervisors**--A blend of "maintenance" and "engineering/operating" types is needed. Strengths of each.

Maintenance--Knowhow, experience, commonsense.

Operating--Youth, enthusiasm, ideas, PR.

Useful to employ one of each in certain areas--but select one for prime responsibility in each area.

(d) **Special Considerations for Beach (Area) Commander**--

Encourage visits by top company people. It helps morale.

Make at least one extensive field visit per day.

Helicopter surveys--personally at least every other day. Keep in close contact with your helicopter observer.

Set up an area near your headquarters where you can meet with people away from phones and radios.

Maintain a close relationship with your historian; use him as a witness.

Don't get trapped by "good guy" decisions.

Make bold changes in personnel.

Solicit competent medical advice on how to treat injuries and claims, especially from volunteers.

Don't make minor decisions--delegate all you can.

Set up first line supervisors as "proprietors" of their areas.

Be alert for physical and mental problems.

Don't lose your "cool," but be human.

Keep your sense of humor.

Be consistent and fair.

Be aware that you are the one that becomes the model for protection of the Company's interest.

To an outsider--you are the Company.

Set up claims adjuster in your area to document claims and settle minor ones on the spot.

2. **Organization**

   (a) Assign someone to set up your headquarters.

   (b) Make quick assessment of the area by talking with local people and making a map survey.

   (c) Develop an organization chart on the spot, no matter how rough.

3. **Marinas**

   (a) Contact Harbor Master to close harbor, if this would protect the harbor or aid the clearup.

   (b) Use marine surveyor to assess situation before oil hits. Most small boat harbors are in poor condition.

   (c) Boom off small boat harbors--tend them so they can be opened and closed.

   (d) Use local boatmen.

   (e) Minimize straw, use vacuum trucks with hose extensions. Use small boats or special small barge with vacuum equipment.

4. **Esteros**

   (a) Protect mouth by booming off.

   (b) If current is too strong, use "Homan" boom--Vee shaped boom to direct oil to baffle booms or shore.

5. **Sandy Beaches**

If oil contamination is extensive, the use of heavy equipment is a far better answer than manual labor.

(a) Graders and paddle wheel loaders are best suited for flat beaches with no obstructions.

Many models are available--an evaluation is needed.

Special models can work in soft sand.

Dozers can push paddles in soft sand.

Need for good operators is critical.

(b) Handtools--When job scope reduces justification of heavy equipment, continue with manual labor. If succeeding small deposits of oil are not picked up, they can be covered by succeeding tides or carried out to sea again.

Use rakes, shovels, plastic and burlap bags, buckets and barrels.

Try to develop small groups of volunteers with their own leaders. Work with local media and organizations to have volunteers report in this fashion. Then put competent first line supervisors in charge of several of these well-led groups.

Establish simple rules for "Volunteers"--(Even make signs to be placed on beaches):

Fill bags half full

Put bags on plastic sheets

Put bags above high water

Use protective equipment; gloves, boots, hand cream

Generation of ideas--for example, one supervisor found he could use burlap to blot up small patches; later he developed rollers with burlap cover, and cleaned a large beach daily with only a handful of people.

(c) **The great straw controversy.**

Straw is best, cheapest, most obtainable absorbent material.

It is hard to apply and harvest by hand.

It can be effectively broadcast by blower and harvested by crane and hopper barge, to pick up oil close to shore that is out of reach of conventional skimming equipment o. land equipment.

Good for PR--many people can go to work right away; must be controlled.

Best used where currents are low, so straw not carried away by tides.

If used properly, it does help in containing, and apparently keeps heavy oil floating for a longer period than if it were not used.

Not effective on rocky beaches as straw and oil on rocks is more unsightly and harder to clean than oil alone.

Can be a help in seining operation where straw forms a mat and helps to filter.

6. **Rocky Beaches**--"Dead vs. Live" Rocks.

In general, "live" rocks are portions of reefs, have sea life, and should only be cleaned by hand methods. "Dead" rocks have no sea life, can sometimes be moved, or cleaned by hand. No problem to leave them alone if not in the public view.

(a) Rock removal--Hard to justify; only consider under special conditions.

(b) Cleaning by surf action is a good possibility, and was successful. The power of surf to clean is great.

(c) Hand methods are usually the only recourse.

(d) Hydroblasting is useful on sea walls and rip rap.

7. **Inaccessible Beaches**

Best results are with:

(a) 4-Wheel drive vehicles which have good speed and carrying power.

(b) ATV (all terrain vehicles) are low speed but very useful; they can be lifted in. They are excellent to use to carry material picked up by volunteers or laborers. Good for use on reefs.

(c) Helilifting.

8. **Disposal of Oily Material**

(a) Dump sites must be approved by Regional Water Quality Control Board.

(b) Disposal site construction requires specialized knowledge. We used silos with layered fill. To follow biodegradation, we installed test bores.

(c) Minimize use of roads, as load, especially straw and paper, blows off. There is a possibility of hazard from oil dripping on roads. Line truck beds with plastic if necessary.

(d) Discing is useful at beaches not used by the public.

(e) Study the beach areas. During storms, sand will scour. In other periods, sand waves will build the beach up. Over 600,000 cu. yds. move on and off Stinson Beach every year. Beach heights can change by 4 to 6 feet. Total oil-sand mix we removed from the 5-mile stretch of Stinson Beach was approximately 6,000 cu. yds.

WILDLIFE CARE

1. THE PROBLEM--"Care of the Wildlife Affected by the Spill"

   (a) Of the several hundred thousand birds in the Bay Area, 7,000 were affected by the oil. These came ashore from Pt. Reyes to Santa Cruz.

   4,300 birds of 25 different species were picked up alive. The major species were western grebe (54%), scoter (22%) and murre (11%).

   As of May 1st, there were about 300 alive in captivity and another 150 have been released.

   (b) Seals, fish, and other higher forms of wildlife were not affected.

   (c) **We were not prepared to handle this problem.**

2. CHRONOLOGY OF EVENTS:

   (a) A team of ten people was set up at 9:00 A.M., Monday, January 18, 1971, to handle the problem. At this time, the size and scope of the problem were not known.

   (b) The first two days were spent gathering birds from the shores.

   (c) By the third day, Wednesday, the volunteer effort to help the birds had grown into the hundreds. They were effectively picking up birds and had set up approximately thirty bird cleaning stations throughout the Bay Area. A decision was made to support these bird centers with materials and transportation for the birds.

   (d) On Wednesday, the ten-man team was reformed into a supply and transportation organization for bird care.

      1. Two members manned the command post at the Long Wharf, six were field representatives assigned to specific geographical areas and two drove trucks and handled miscellaneous assignments.

      2. The six field representatives--

         (a) Visited the bird centers in their area daily to assess the centers' needs and provide the personal contact with the volunteers that proved to be very valuable. They also arranged for supplies and transportation, through the command post, for each center. Supplies ranged from mineral oil (25,000 gals.) to Q-Tips and safety pins.

3. To streamline the supply problem, a supply center was set up at a large bird center in each of the three major geographical areas.

(e) CRC, under the direction of Ed Mertens, provided technical assistance on bird cleaning and care by flying Mr. Phil Stanton out from Massachusetts. Stanton spent about a week here from Friday (1/22/71) visiting the bird centers offering advice to those who wanted it.

(f) After about two weeks, the majority of the birds had been picked up and cleaned. The following two weeks were spent consolidating all bird centers into two rehabilitation centers.

1. The San Francisco Zoo.
2. Richmond Bird Center.

3. **PARTICIPATION BY GROUPS AND ORGANIZATIONS:**

(a) API--Mr. Keith Hay, API Wildlife Director, flew out from Washington, D.C. to observe. He brought Mr. Phil Douglass of the National Wildlife Federation with him.

(b) Governmental Agencies.

1. Bureau of Sportfisheries and Wildlife (U.S. Wildlife Service) has legal responsibility for migratory birds.
2. Department of Fish and Game is the State controlling body.
3. The Department of Fish & Game did the little governmental controlling that was done. For the most part, they had difficulty dealing with the private groups. This was primarily because the Department of Fish & Game does not have any vets and so they had little success convincing the volunteer vets that they knew what was best.

(c) Animal Protection Groups.

1. Audubon Society, S.P.C.A., Humane Society.
2. These groups became involved to varying degrees as they saw fit. For the most part, they were reasonable people and their efforts were helpful.

(d) "Ecology" and other "Self-Appointed" Groups.

1. There were about ten of these groups that became deeply involved in this effort. They were for the most part inefficient, unreasonable and emotionally involved.
2. Each of these groups felt that they had the answer to bird cleaning and care. Several of these groups were extremely reluctant to "give up" the birds to one of the rehabilitation centers and close down.

(e) Local Volunteer Veterinarians.

1. Six local vets contributed many hours of their time to the problem.
2. Most of them were involved with "Ecology Groups."
3. They influenced these groups considerably.

(f) The San Francisco Zoo.

1. The Department of Fish & Game arranged for the San Francisco Zoo to be a cleaning and rehabilitation center.
2. The Zoo received adverse publicity because of a high initial death rate. This publicity thwarted efforts to make this the single rehabilitation center.
3. The Zoo has been a very cooperative and helpful organization during this problem.

4. VOLUNTEER ASSISTANCE:

(a) Bird cleaning and care was almost entirely a volunteer effort.

(b) No volunteers were paid and very few asked to be paid. The settlement of claims for out-of-pocket expenses was handled in the same manner as for other oil spill volunteers.

(c) Volunteers that worked under the direction of established agencies (i.e., Audubon Society) were very cooperative and helpful.

(d) Volunteers that worked under the "Ecology" or "Self-Appointed" groups had a tendency to get out of line. In many cases, these people were and still area a bigger problem than the birds themselves.

5. CLEANING AND HUSBANDRY:

(a) There are two phases--

1. Cleaning the oil from the bird.
2. Rehabilitation for the cleaned bird until he is ready to return to the wild.

(b) There are basically two types of cleaning systems--

1. Aqueous system (Polycomple A-11, detergents, etc.)
2. Solvent system--(Mineral oil, etc.)

Mineral oil was used almost exclusively in this spill. It was available and the local volunteer vets at the centers thought it was the best.

Research is going on today on both systems. At present, both have their drawbacks but the Aqueous system offers the most promise for a speedy return to the wild.

(c) There are two schools of thought on rehabilitation or husbandry.

1. Place the cleaned birds in their natural surroundings as soon as possible and let them recover there.
2. Keep the bird indoors and nurse him back to health in a hospital type atmosphere.

The first method experiences a higher initial death rate but is much less expensive.

The second method prolongs the inevitable death perhaps, is much more costly, but may in the long run save more birds.

A decision has to be made which method is used. The main factor to be considered is "Is the species in danger of becoming extinct?"

6. CONCLUSIONS:

(a) SOCAL had a technical plan for wildlife care but not an administrative plan. The government agencies contingency plans were not adequate either. As a result, the bird cleaning effort was disorganized initially and it involved many uncooperative and undesirable groups of people.

(b) The Department of Fish & Game did not have complete command of the situation.

(c) SOCAL had to assist in the direction of the effort.

(d) While the birds were the initial problem, the problem today is the "people." It is a public relations problem.

7. RECOMMENDATIONS:

(a) A contingency plan should be developed with the assistance of all wildlife agencies.

1. The Department of Fish & Game or other government agency responsible should be encouraged to take the lead in developing the plan.
2. The company should meet the people that are associated with the various wildlife agencies and evaluate them, their organization and facilities.
3. The plan should receive the backing of as many of these agencies as possible.
4. The plan should include organization as well as cleaning techniques.
5. The plan may vary from one location to another.

(b) This plan for wildlife care should be clearly communicated to the public as soon as it is formulated and again at the time of the emergency. This will gain the public backing for the effort and help eliminate involvement of the undesirable element.

CONTRACT ADMINISTRATION

1. **GOOD MONEY MANAGEMENT REQUIRES:**

   (a) The use of specialists charged with the responsibility of controlling the finances.

   (b) Thorough and competitive contracts.

   (c) Accurate daily timekeeping.

   (d) Detailed audit of all invoices.

   (e) Documentation which will assure maximum reimbursement from the insurance carrier.

2. **PRE-EMERGENCY PLAN:**

   (a) Standing contracts with reputable labor and equipment suppliers are a necessity.

   Update yearly or when wage rates change.

   (b) Contracts should be thorough and detailed.

   1. Wage rates and rules governing their application.

      -Overtime
      -Subsistence
      -Transportation
      -Shift Differential.

   2. Equipment Rates--

      -EGCA & PUC Heavy Equipment Rates
      -Standby Rates

   3. Overhead (what is included?) and profit.

   4. Charges for special equipment or other work not specifically covered in the contract should be approved daily so as not to get out of hand.

   (c) Examples of types of contracts needed.

   Several companies in each group should be signed to standing contracts--

   1. Helicopters and fixed wing aircraft.

2. Tugs, barges, skimming equipment and oil boom.
3. Vacuum trucks.
4. Beach cleaning equipment.
5. Labor contractors.
6. Heavy construction equipment.
7. Consultants.
8. Debris disposal sites.
9. Bird cleaning and holding centers.

3. AT TIME OF EMERGENCY:

(a) Put each contract into force by writing service orders detailing work to be done.

(b) Require daily equipment logs and time sheets to be signed by authorized company representative.

(c) Minimize oral contracts.

(d) Publish daily estimates of expenditures to date to keep management apprised of overall costs.

(e) Have claimant sign release forms when they have been reimbursed for losses or when damages have been repaired.

4. POST-EMERGENCY:

(a) Perform a detailed audit of all invoices.

(b) All invoices should be approved by an employee who has direct knowledge of the work.

(c) Cross check invoices to eliminate double payment.

(d) Obtain legal advice on charges that are reimbursable by an insurance carrier.

5. CONCLUSION:

Time spent on contract administration, pre-emergency and during the emergency, will pay handsome dividends when it comes time to pay the bills. Preplanning and strict control can avoid overcharges by contractors, costly attorney fees, and painful litigation and loss of public good will.

RECORDKEEPING

1. Purpose of keeping record of activities.

(a) Keep track of rapidly developing activities which are happening continuously around the clock.

(b) Keep records which could be used in defense against law suits.

(c) To record data concerning oral contracts.

(d) For future reference and studies.

2. Types of records.

(a) Personal and historian notes which log ali events.

(b) Photographic records which record the condition of beaches and document all activity. These include:

16 MM Color Movie Film (12,000 feet)
35 MM Color Slides (Approximately 6,500)
Color and Black and White Photographs (1,000)
Video Tape (34 Rolls)

(c) Identification of oil samples by gas chromatograph (fingerprint). It is important to impound all ship retain samples before they are lost and to sample the spilled oil frequently to confirm that you are cleaning up the right oil spill.

(d) Tape recordings of radio transmissions.

(e) Debriefing of field supervisors.

(f) Reports by consultants.

PUBLIC RELATIONS

1. INITIAL STEPS TO DEAL WITH PUBLIC INQUIRIES:

   (a) Refinery P.R. set up phones at wharf and E.R. Building, advised telephone operator on directing calls. Refinery handled calls relating to volunteers, suggestions, complaints, salesmen, status.

   (b) San Francisco P.R. also set up at wharf--dealt mainly with the press.

2. NEWS RELEASES:

   (a) Handled by Corporation P.R. at the Long Wharf in consultation with P.R. in San Francisco.

   (b) Cleanup personnel and P.R. kept each other thoroughly informed.

3. TV, RADIO AND PRESS INTERVIEWS:

   (a) P.R. was very successful in shielding cleanup personnel from interviews in the early stages.

   (b) Joint interview of J.C. Keating by all media on first and fourth day.

   (c) E.D. Kane and J.W. Daily in large panel discussion on TV on fourth evening.

   (d) After first week, many employees interviewed on the beaches.

   (e) We cooperated with the press, attempting to use it to our advantage.

   (f) After the initial exaggeration of the "Disaster," press coverage of the cleanup was favorable to the Company and its efforts.

4. RELATIONSHIPS WITH LOCAL GOVERNMENTAL AGENCIES:

   (a) All were very cooperative--Traffic control, police protection, providing access, facilities, dumpsites.

   (b) All dealings were handled by the Field Commanders.

   (c) Some have billed us for expenses resulting from the cleanup. None has claimed environmental or other permanent damage. Some have been able to get Company donations.

5. RELATIONSHIPS WITH VOLUNTEERS:

   (a) For beach cleanup, provided equipment, supplies, food, coordination and minimum direct supervision.

(b) For bird care, never did gain control--provided equipment, supplies and some degree of coordination.

(c) Coordination was difficult. Many groups, not all in agreement. We did not utilize well the "underground" communications network--press, FM radio and telephone "Switchboard" arrangements. Rapport established too late.

(d) Pay to volunteers--

No payment of wages.

Out-of-pocket expenses and equipment damages.

Company donations to nationally recognized organizations in the name of the volunteers.

Letters of appreciation when identity known.

6. **PUBLICITY:**

(a) Little Company initiated publicity except daily releases.

(b) Phone numbers on radio, TV, press, that volunteers could call for information.

(c) Phone numbers for damage claim information.

(d) Since the cleanup, we have accepted every invitation to speak on the subject. Dozens of different speakers to hundreds of organizations.

7. **LESSONS LEARNED:**

(a) Be open with the press. Do not shy from them. Converse freely with them and turn them to an advantage.

(b) Field Commanders spent much time P.R. They were the Company ambassadors. Select them with care.

(c) Try to develop greater understanding of the volunteer effort so as to better utilize it in the future. Perhaps devise a continuing communication with the volunteer groups; include their groups in the contingency plans.

(d) The public was in the main very helpful in its response--ponder the reasons for this so we can recreate it and utilize it better next time.

LEGAL ASSISTANCE

P.M.&S. ATTORNEYS INVOLVED FROM THE VERY BEGINNING:

(a) Advised nature of records needed for defense against anticipated suits and insurance settlement--photographs, written record of observations and actions, recording of radio traffic, post-spill biological evaluations, detailing of expenditures.

(b) Advised on dealing with volunteers and assisted in volunteer claim settlements.

(c) Assisted witnesses who testified before State and Federal legislative committees.

(d) Are handling negotiation of differences with contractors. Will handle suits against contractors if required.

(e) Handling defense against several large class action suits.

CLAIM SETTLEMENT

INSURANCE ADJUSTER AND COMPANY PERSONNEL SETTLED CLAIMS:

(a) Crawford and Company set up early to handle claims. Established offices at major marinas and made their presence known. Phone numbers for claim information publicized on TV and in newspapers.

(b) Crawford handled:

Boat cleaning and painting.

Private docks and beach property.

Clothing and personal effects.

Medical expenses.

(c) Cleanup personnel handled claims by:

Local governments--for materials, services, damages.

Contractors--for equipment damages.

Volunteer groups--for out-of-pocket expenses and equipment damages.

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QM0492

CORRESPONDENCE SUBCOURSE LESSON EXERCISES

WAIT

DO NOT GO ON TO THE LESSON EXERCISES UNTIL YOU HAVE STUDIED AND UNDERSTAND THE LESSON ASSIGNMENT.

QM0492

Credit Hours: 2

LESSON EXERCISES

REQUIREMENT. Exercises 1 through 20 are multiple choice. Each exercise has only one single-best answer. Indicate your answer on the answer form.

1. A dark brown oil slick approximately 1 mile wide (of more than 10,000 gal) and extending 10 miles upstream over inland waters would be classified as a

   a. minor spill.

   b. medium spill.

   c. major spill.

   d. potential spill.

2. The standard term used to describe the appearance of a minor oil spill involving approximately 50 gallons per square mile is

   a. silvery.

   b. slightly colored.

   c. dull.

   d. dark.

3. Which of the following causes of oil spills would be attributable to human error?

   a. Seepage from an underground deposit.

   b. Failure of off-shore drilling equipment.

   c. A tanker breaking up at sea.

   d. Deballasting a tanker.

4. If the oil spill which occurred off the coast of Santa Barbara, California, in 1969 was caused by mechanical failure, it was probably due to

   a. oil seepage from underwater deposits.

   b. faulty drilling equipment.

   c. carelessness.

   d. failure to close safety valves.

5. The cost of oil spills is very expensive in terms of financial and ecological losses. Which of the following would not be considered an ecological loss?

   a. Destruction of fish and wildlife.

   b. Changing of landscape.

   c. Damage to property.

   d. Destruction of natural beauty.

6. Drainage from class III supply point operations should be directed

   a. away from open streams.

   b. towards cultivated land.

   c. towards open streams.

   d. towards wooded areas.

7. If a line breaks during pipeline operations, the pipeline should be

   a. repaired without interrupting oil flow.

   b. moved to another location.

   c. tested before repairs are made.

   d. evacuated before repairs are made.

8. In the Federal organization for oil pollution control, the national body responsible for planning and preparedness prior to a pollution spill is the

   a. National Response Center.

   b. National Response Team.

   c. Environmental Protection Agency.

   d. U.S. Coast Guard.

9. The regional site for pollution spill response activities is the

   a. National Response Center.

   b. On Scene Commander.

   c. Regional Response Center.

   d. Regional Response Team.

10 Coordination and direction of Federal pollution control efforts at the site of an oil spill are the responsibility of the

   a. National Response Team.

   b. Regional Response Center.

   c. On Scene Commander.

   d. Regional Response Team.

11. On Scene Commanders for oil spills on inland navigable waters and their tributaries are provided by the

   a. U.S. Coast Guard.

   b. Regional Response Center.

   c. National Response Center.

   d. Environmental Protection Agency.

12. Any person discovering an oil spill on or near a military installation should immediately notify the

    a. National Response Center.

    b. On Scene Commander.

    c. OIC or NCOIC of the facility.

    d. Regional Response Team.

13. Which phase of the Federal five-phase system for oil spill operations includes cleanup and disposal?

    a. Phase I.

    b. Phase II.

    c. Phase III.

    d. Phase IV.

    e. Phase V.

14. Which of the following is used to contain an oil spill and prevent it from spreading to a wider area?

    a. Skimmers.

    b. Floating booms.

    c. Suction pumps.

    d. Chemicals.

15. Under which of the following conditions may chemicals be used to treat a floating oil spill?

    a. To protect large numbers of waterfowl from perishing because of the proximity of the floating oil.

    b. To protect fresh water supply sources from becoming contaminated by the oil.

    c. To protect major shellfish harvesting grounds from contamination.

    d. To protect major shellfish or finfish nurseries from destruction by the floating oil.

16. Chemicals which aid in dissipating spilled oil are

    a. detergents.

    b. absorbants.

    c. gelling agents.

    d. dispersants.

17 Detergents aid in cleaning beaches and contaminated soil, but they cause

    a. chemical pollution.

    b. air pollution.

    c. collection and disposal problems.

    d. hazards to marine life.

18. Which of the following recovery methods involves the removal of fine suspended oil particles by means of air bubble streams?

    a. Gravity separation.

    b. Coagulation.

    c. Filtration.

    d. Bio-oxidation.

19. Percolation, vacuum filtration, and centrifuging are techniques used in

    a. oil recovery.

    b. polluted soil removal.

    c. sludge disposal.

    d. restoration.

20. Which of the following methods of soil removal is used to expose deeply contaminated soil?

a. Mechanical tilling.

b. Plowing under.

c. Physical removal.

d. Bulldozing.

REQUIREMENT. Exercises 21 through 25 are matching exercises. Column I lists the characteristics of oil spills. Column II lists the classifications of oil spills. Select the classification in column II for each oil spill listed in column I and indicate your answer on the answer form. The choices in column II may be used once, more than once, or not at all.

Column I		Column II
21.	An oil spill of less than 1,000 gallons on inland waters. The spill involves no threat to public health or welfare.	a. Minor spill.
22.	A spill in coastal waters involving more than 100,000 gallons. The spill generates wide public interest.	b. Medium spill.
23.	An oil spill of 8,000 gallons on inland waters. The spill threatens public health or welfare.	c. Major spill.
24.	A spill of 75,000 gallons in coastal waters. The spill threatens public welfare in beach areas.	d. Potential spill.
25.	An oil spill of 15,000 gallons on inland waters. The spill threatens public health.	

REQUIREMENT. Exercises 26 through 29 are matching exercises. Column I lists problems associated with the use of chemicals in treating floating oil spills. Column II lists four types of chemicals which may be used under certain conditions to treat floating oil spills. Select the chemical in column II associated with each problem listed in column I and indicate your answer on the answer form. The choices in column II may be used once, more than once, or not at all.

	Column I		Column II
26.	Distribution and collection problems.	a.	Dispersants.
27.	Chemical pollution problem	b.	Sinking agents.
28.	Contamination of bottom aquatic life.	c.	Floating absorbents.
29.	Air pollution problem.	d.	Burning agents.

REQUIREMENT. Exercises 30 through 35 are true-false. Indicate your answer on the answer form by using A for TRUE and B for FALSE.

30. A minor oil spill is one which threatens public health or welfare.

31. Once an area has been contaminated by oil, the whole character of the environment is changed.

32. If a line break occurs during pipeline operations, care must be taken to recover as much fuel as possible.

33. All oil spills are caused by human error and mechanical failure.

34. All Federal agencies are required to develop emergency plans and procedures for dealing with accidental pollution.

35. Cleanup costs are of prime concern in oil spill control operations.

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